

# Mining

CONGRESS JOURNAL



MARCH  
1952





# HERE'S THE ANSWER

...to quick, easy  
product size changing

Choose either Link-Belt method for fast changes of product size—  
hand-operated worm gear (left) or push-button controlled motor drive.

## LINK-BELT Type "C" Two-Roll Coal Crusher permits accurate adjustment for size

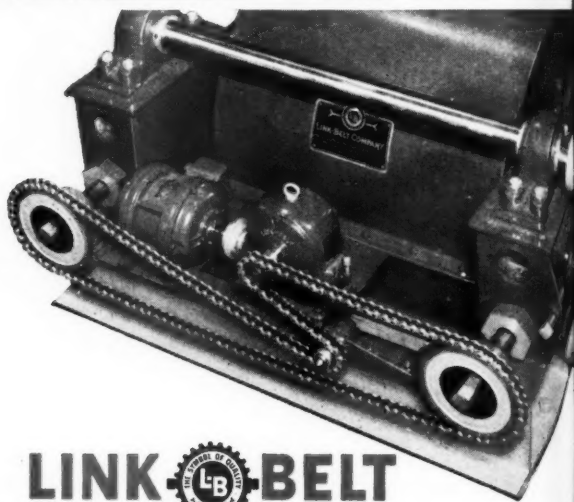
If fluctuating market requirements call for frequent changes of your product size, here's the coal crusher for you. With Link-Belt's Type "C" Two-Roll Coal Crusher, you can change roll settings fast... either manually or by push-button control.

Important, too—tooth-to-tooth impact of double rolls *cracks* the lumps, rather than crushing them. High capacity is assured, with minimum power and maintenance.

With the accurate roll adjustment obtainable in Link-Belt's Type "C" Crusher, the product contains a minimum of fines and oversize.

Like all Link-Belt coal preparation machinery, Link-Belt Coal Crushers are ruggedly built... have compiled impressive low-maintenance records under years of tough service. Let a Link-Belt engineer give you complete information.

12,716



**LINK-BELT**

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Salt Lake City 1, Toronto 8, Springs (South Africa), Sydney (Australia).

# YOU'LL FIND THE LOWEST PRODUCTION COST PER TON WHERE COAL MINING AND COAL PREPARATION OPERATE INDEPENDENTLY



S-D "Automatics" moving over Surge Bin is one continuous, smooth operation, opening and closing doors automatically.



The "Automatic" Drop Bottom car is the only practical method of completely filling a Surge Bin to track level.

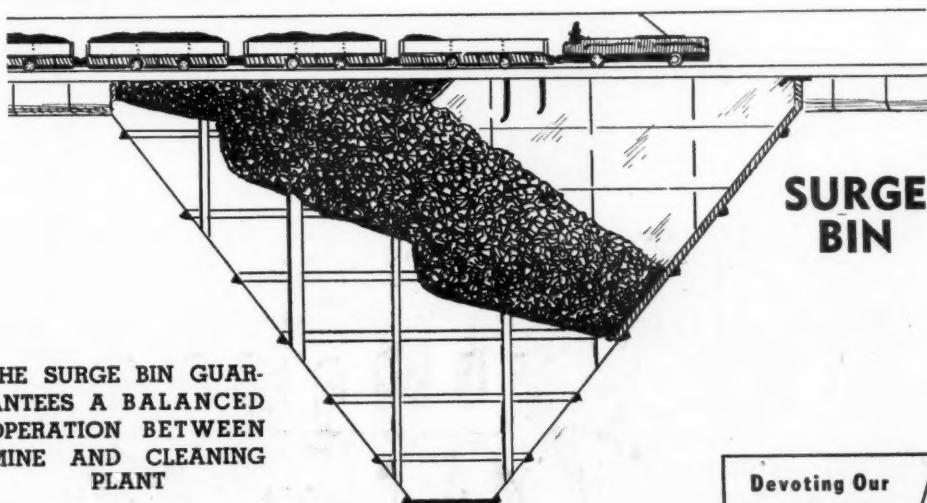
You only have to look around a bit to find the answer to rock bottom production costs of coal. The facts are wrapped up in those mines where mining at the face and the preparation plant can function independently of each other.

The S-D Automatic system of coal transportation from mine to cleaning plant is your guarantee of a continuous, even flow of coal, so necessary to low production costs. This includes an adequate Surge Bin which will serve as a temporary storage of coal in transit . . . the production balancing point between mine and preparation. This Surge Bin plus S-D "Automatic" Bottom Dumping Cars is essential to the low cost, independent working of mine operation and preparation plant.

Any cleaning plant works best, and at the least cost, with an even continuous supply of coal. The Surge Bin continues to supply coal to the preparation plant when, for any cause, there is a delay at the face.

With an adequate surge bin, one shift operation of cleaning plant is often sufficient to take care of two shift operation of mine. Breakdowns or delays at the preparation plant need not stop mine production because the surge bin will take the coal until repairs are made.

For additional facts and details, phone H. W. Sanford, Jr., Sales Manager, 3-4191, Knoxville.



**SANFORD-DAY IRON WORKS**  
KNOXVILLE TENNESSEE

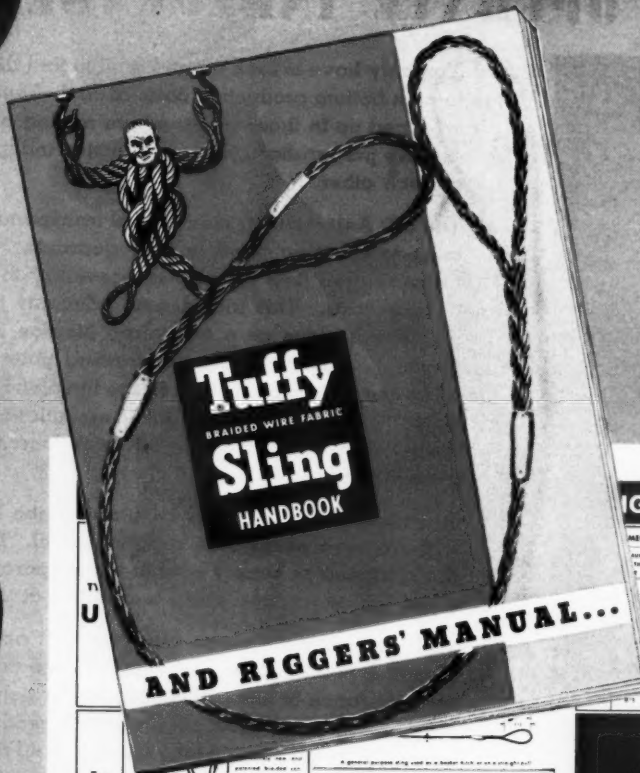
Devoting Our  
Entire Capacity  
to the Building  
of Better Mine  
Cars for Over—

**50**  
YEARS



# Just Off to Help You

**Free!**



## WEIGHTS AND SAFE LOADS...

DIMENSIONS	WEIGHT IN POUNDS		FITTING SIZES		SAFE LOADS IN POUNDS			
	FACE LENGTH IN INCHES	FACE AREA SQUARE FEET	FACE AREA SQUARE FEET	NONE	STRAIGHT PULL	BAGGIE PULL	WEDGE PULL	WEDGE PULL
5	0.8	0.08			350	1,200	1,100	1,100
6 1/2	1.8	0.18			1,500	2,400	2,100	2,100
8	3.0	0.30	SEE		2,400	4,500	3,600	3,600
9 1/2	4.8	0.45	11-11 TABLE		4,000	8,000	6,000	6,000
11 1/2	7.4	0.70	12-12 TABLE		6,000	12,000	10,500	10,500
14	10.0	0.92			7,800	15,600	13,500	13,500
15	13.0	1.2			10,000	20,000	17,500	17,500
18	21.0	1.8			15,000	30,000	26,000	26,000
24	35.0	2.7			22,000	44,000	38,000	38,000

### Eye Splices



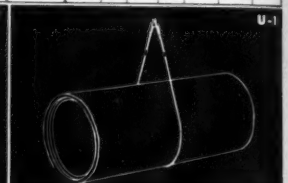
General purpose slings used as a leader hook or as a single hook.

STANDARD EYE SIZES FOR U-1 TUFFY SLINGS			
1/2	Tuffy Sling	4 eye	
3/4	Tuffy Sling	6 eye	
1	Tuffy Sling	8 eye	
1 1/4	Tuffy Sling	10 eye	
1 1/2	Tuffy Sling	12 eye	
1 3/4	Tuffy Sling	14 eye	
2	Tuffy Sling	16 eye	

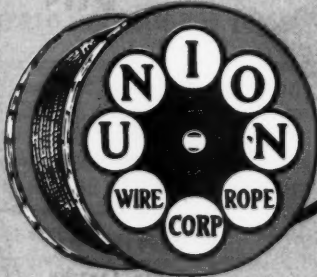
### TYPE U-1-T



Tuffy type U-1-T is the most popular type of sling used in the industry. It is made of braided wire fabric and is available in many sizes and configurations.



DIMENSIONS	WEIGHT IN POUNDS		FITTING SIZES		SAFE LOADS IN POUNDS			
	FACE LENGTH IN INCHES	FACE AREA SQUARE FEET	FACE AREA SQUARE FEET	NONE	STRAIGHT PULL	BAGGIE PULL	WEDGE PULL	WEDGE PULL
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14	10.0	0.92			7,800	15,600	13,500	13,500
15	13.0	1.2			10,000	20,000	17,500	17,500
18	21.0	1.8			15,000	30,000	26,000	26,000
24	35.0	2.7			22,000	44,000	38,000	38,000



# Union Wire Rope



# the Press and Ready You Cut Sling Costs!

**Only Handbook of its Kind in the Sling Field.** You just can't measure Tuffy Slings by the old sling standards. Because of the new characteristics and efficiencies developed in Tuffy's 9 part, machine braided wire fabric construction, all users of slings need this Sling Handbook to know the facts about lower sling costs through longer sling service. You can have it **FREE** for the asking. It gives you—

**Factual Data On 12 Sling Types and On Various Types of Sling Fittings.** That's right, all the working data—dimensions, weights, safe loads, standard eye sizes, tuck lengths, sizes and data on standard and special fittings, straight pull, basket, choker and angle hitches, simplified ordering procedure, etc., on 12 factory fitted and factory packaged sling types. Also there is valuable information on sling care and on braided wire fabric for rigging your own slings.

**30 Illustrations of Sling Uses**—help you determine the types to fit your sling jobs. Should none of the 12 factory fitted types exactly fit, then the handbook tells how our engineers develop special types for special uses.

**Step by Step, Illustrated Instructions On Splicing Both Tuffy Slings and Wire Rope.** Splicing the braided wire fabric of Tuffy Slings is made easy with visual instructions. And, to make the sling handbook doubly useful, it contains 24 pages of visual instructions on making 7 kinds of wire rope splices, attaching sockets, ferrules and thimble clamp. Efficiencies of wire rope attachments, as established by actual strength tests, are tabulated.

You'll find this Sling Handbook and Riggers Manual easy to use and highly useful. A copy is yours with our compliments. Simply fill out and send the coupon.



Tie a knot in a Tuffy Sling. Note its flexibility. Pull the knot tight—then untie it. See how readily the patented braided fabric straightens out again.



It's hard to do by hand without the aid of a vise. If you are able to kink a Tuffy, then see how easily the patented braided wire fabric straightens out without material damage.

**Get FREE Sling Sample—See For Yourself All The Advantages of Tuffy Slings**

To see how entirely different they are you just have to handle and try out a Tuffy Sling. That's why we have made up a supply of 3 ft. samples. Get yours and prove for yourself Tuffy Sling superiority. Fill out the coupon—It's **FREE**.

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Kansas City 3, Missouri

Please send **FREE** of Cost—

☐ Tuffy Sling Handbook

☐ 3 ft. Sample of Tuffy Sling

Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

# Mining Copper "UPSIDE-DOWN"

in the  
**ANDES MOUNTAINS**



In the lofty Uspallata Pass of the famed Andes Mountains, almost 13,000 feet above sea level, stands the huge bronze "Christ of the Andes", marking the boundary between Chile and Argentina.

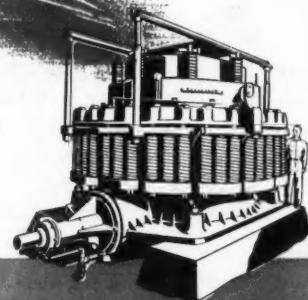


**THIS** interesting view shows Sewell, the upper mining camp of El Teniente Mines of the Braden Copper Company . . . carved in the western slopes of the Chilean Andes, at an elevation of 7,000 feet.

El Teniente Mine is unique in that it is "upside down". The ore occurs high up on the mountain side and is dropped some 2,000 feet through chimneys in solid rock to an adit tunnel haulage way. Miners and supplies are hoisted, rather than lowered, to their working places.

The crushing plant at Sewell includes twelve "SYMONS" Cone Crushers which reduce all ore mined to less than  $\frac{3}{8}$ " diameter for further treatment.

No matter where you travel in the Mining World . . . from the Andes Mountains to the Zambesi River country . . . you will find "SYMONS" Cone Crushers the outstanding choice among the world's leading producers of ores and industrial minerals.



"SYMONS" Cone Crushers . . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

**NORDBERG MFG. CO., Milwaukee, Wisconsin**

"SYMONS" . . . A NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD



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MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

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"SYMONS" Primary Crushers



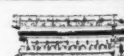
Grinding Mills



Mine Hoists



"SYMONS" Vibrating Bar Grizzlies and Screens



Diesel Engines

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FOR MARCH, 1952

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*Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress*

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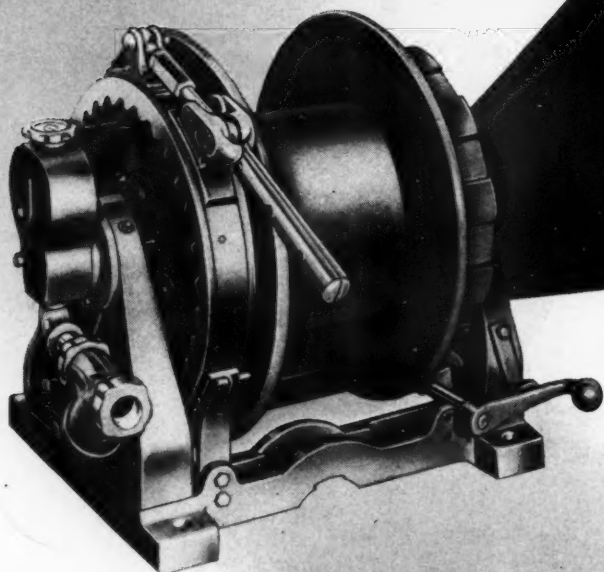
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**Exec. Vice-Pres.**  
**and Secretary**

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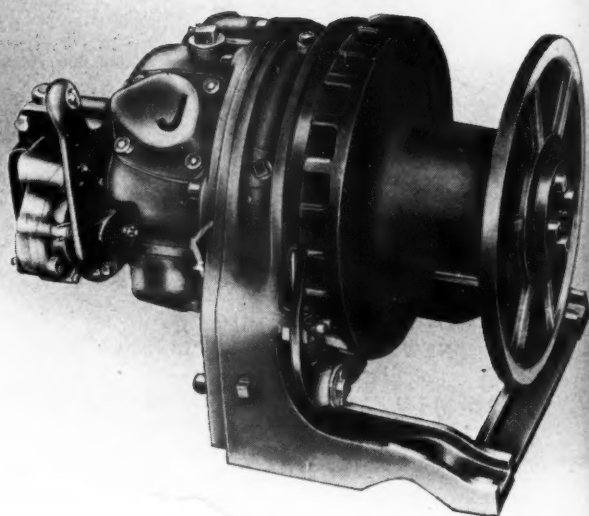




**TOP:** Model F-113 "Turbinair". Compact, simple design with motor *inside* the drum. Direct power transmission from motor to drum assures maximum efficiency. Simple, accessible controls make operation easy.

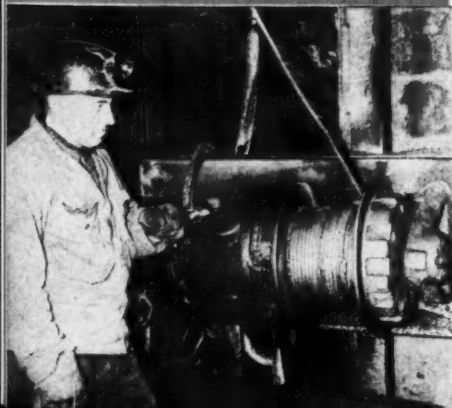
**RIGHT:** Model DW-111 "Pistonair". Features reversible power with light weight. Four-cylinder,  $3\frac{1}{2}$  h.p., reversible motor will handle up to 1200 lbs.

**FAR RIGHT:** Model L-111 "Pistonair". For heavy hoisting jobs.  $7\frac{1}{2}$  h.p., reversible, five-cylinder motor for loads up to 2000 lbs.



## OVER 100 YEARS OF ENGINEERING LEADERSHIP

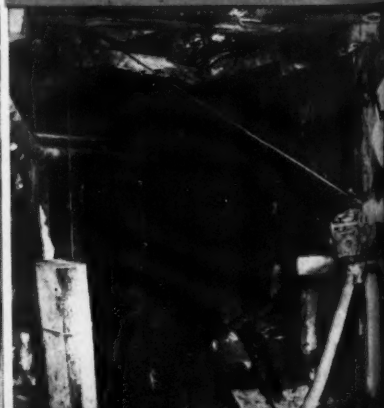
Joy L-111 reversible "Pistonair" Single Drum Hoist operating in a magnetite iron mine in the Adirondack region of New York.



Joy E-112 "Turbinair" lifting timbers in a raise in a western mine. The extra rope capacity of the E-112 (450' of  $\frac{3}{8}$ " rope) makes it applicable to any of the utility hoisting needs in this mine.

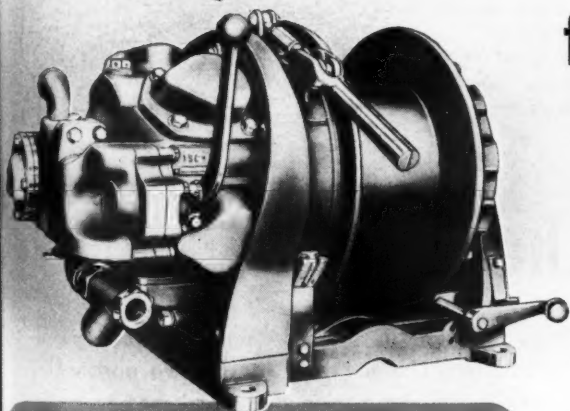


Joy AW-80 Air Winch hoisting timbers in a drift in a Canadian mine. At a weight of only 85 lbs., this unit will lift 500 lbs!



# BETTER SERVICE from SINGLE DRUM HOISTS

They're real Mining Hoists—  
designed and built from long  
field experience expressly  
for underground use



Have you seen this film?

**"HARD ROCK  
MECHANIZED  
MINING"**

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Address our Film Booking Office.

Joy Single Drum Mining Hoists are compactly designed, of modern, high-strength alloy metals, for lighter weight with greater power and efficiency.

The complete Joy line includes the "Turbinair" series which develop maximum horsepower per unit of weight; the "Pistonair" with reversible four or five cylinder motors; and compact, rugged electric-powered models which feature space-saving short-length external motors.

Joy Single Drum Hoists are built with lifting capacities ranging from 500 to 3500 lbs., and rope capacities from 150 to 1500 ft. "Pistonair" models have a positive acting safety brake which holds the load in any position when the throttle valve is "off."

Joy also manufactures a complete line of Shaft Hoists, and Two- and Three-Drum Slusher Hoists in capacities to handle all hoisting and scraping needs.

Write for Bulletin, or . . .

*Consult a Joy Engineer*

WAD M 4028

## JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

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#### HORSE HOIST DAYS

*Dobbin went round and round...and the rock comes up in a wooden pail. Missouri lead mine about 1890.*

An enlargement of this photo suitable for framing is yours for the asking.

## Times Have Changed . . .

Hoisting rock with living horsepower, old-fashioned blasting methods and other inefficient mining techniques have become so obsolete that no operator could afford to use them today.

Times have changed . . . and so have blasting methods!

The latest major development in underground blasting techniques is the use of milli-second delay detonators—pioneered by Atlas in the

ROCKMASTER® Blasting System. With proper drill pattern and loading, the one-two punch of split-second detonation gives breakage never before possible in hard rock mining. And there's no substitute for good breakage to assure maximum production from loading, hauling and crushing equipment.

Are your blasting methods up-to-date? You can find out by sending for the free 20-page booklet on ROCKMASTER blasting. It will pay you to investigate!

# ATLAS

## EXPLOSIVES

"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

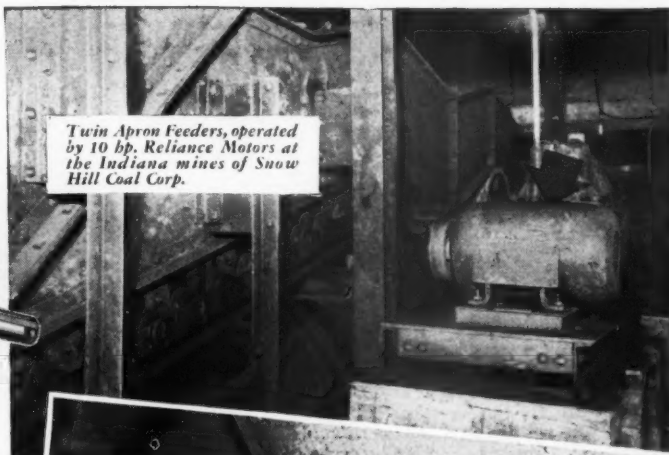


*Reliance Precision-Built, Totally-enclosed, Fan-cooled A-c. Motor.*



THE *Trend* IS TO

**RELIANCE**  
*Precision-Built*  
**MOTORS**



*Twin Apron Feeders, operated by 10 hp. Reliance Motors at the Indiana mines of Snow Hill Coal Corp.*



*Weigh Pan Gate operated by 15 hp. Reliance Motor at Snow Hill mine.*

... for dependable, economical power above ground!

Fan-cooled Reliance *Precision-Built* Motors are found on more and more dirty jobs above ground. Here's a trend that means operators everywhere are realizing in these rugged, long-lived motors the same dependability and economy which have made Reliance Motors the Number One choice for the toughest jobs underground.

In the operation of equipment such as apron feeders, weigh pan gates, shaking and vibrating screens, washers, pumps, air tables, crushers and conveyors... Reliance *Precision-Built* Motors can offer you real help in keeping production up, costs down. Write today for Bulletin B-2101 on *Precision-Built A-c. Motors* from  $\frac{1}{4}$  to 300 horsepower.

**Sales Representatives in Principal Cities**

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*"Motor-Drive is More Than Power"*

1116 Franklin Road, Cleveland, O. 15



**ON TOP**

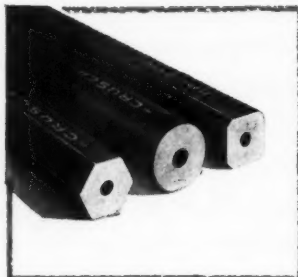


*OR*  
**UNDERGROUND**  
*it's*  
**CRUCIBLE**  
**HOLLOW**  
**DRILL STEEL**  
*all the way*

Whether driving a tunnel or clearing a mountain pass — tough Crucible Hollow Drill Steel gets the job done better, faster — at lower cost per foot drilled. This quality steel is built to take the punishment of around-the-clock operation of modern, high air-pressure rock drills. And you have the assurance of minimum breakage . . . and an end to expensive bit loss.

That's because of Crucible's rigid *pre-testing* of every lot of Crucible Hollow Drill Steel. What's more, Crucible Hollow Drill Steel is backed by the experience of quality steelmakers. Then too, field metallurgists with broad background on your job are available — should you need them.

Insure the quality of your job — cut costs — use Crucible Hollow Drill Steel.



**CRUCIBLE**

first name in special purpose steels

52 years of *Fine* steelmaking

**HOLLOW DRILL STEEL**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

[ Page 10 ]



# CONVEYING Systems

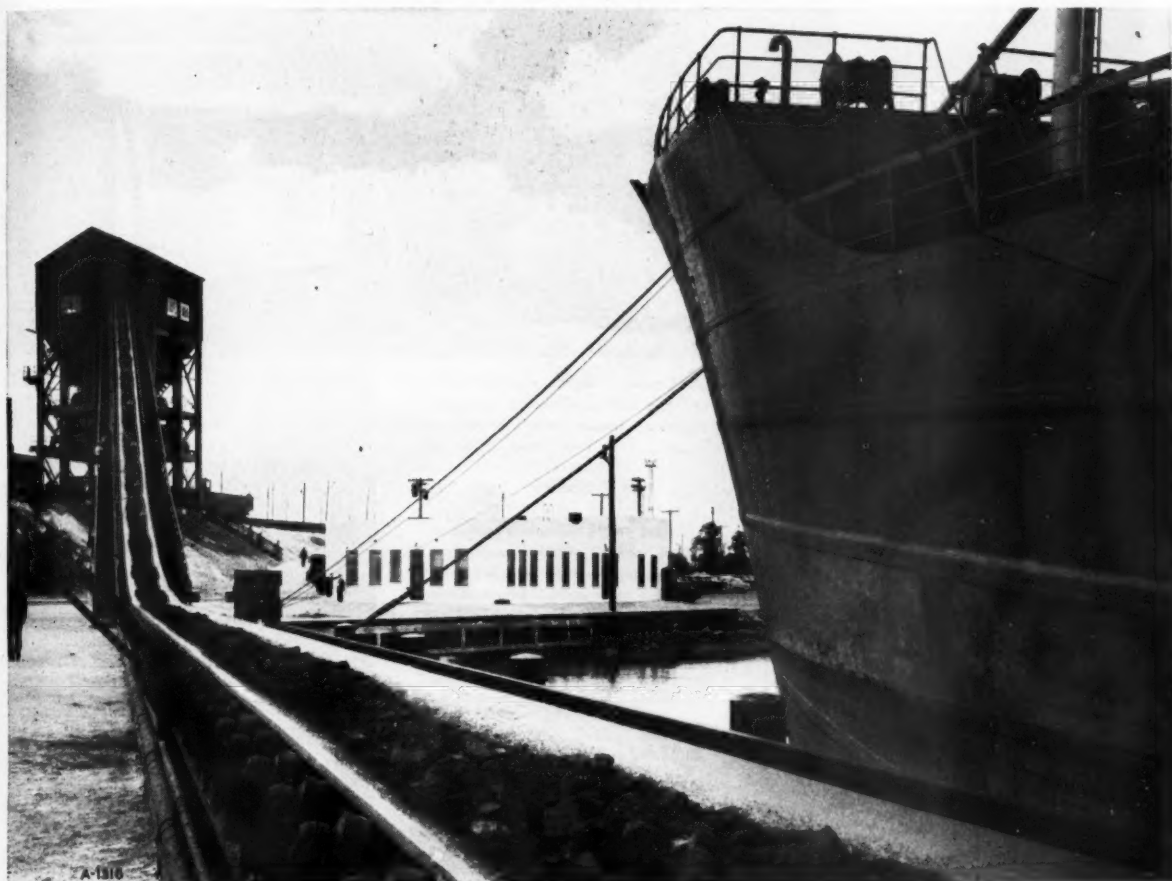
for moving ore by the **SHIPLOAD**  
or **TRAINLOAD** with speed and economy

A shipload is "a lot of ore".

To move it from the ship to a string of railroad cars some 900 feet away, at a rate of 2,000 tons per hour, is no small task. However, S-A engineers are highly skilled in the art of solving these problems—from drawing board to reality. That is why industry has turned to them consistently

for conveying systems designed and equipped to give efficient, low cost handling of bulk materials.

An S-A engineer represents 50 years of experience plus a complete line of equipment... he is well qualified to talk to you about bulk ore handling problems. Write us for full details... no obligation.



Belt Conveyors  
Belt Trippers  
Belt, Pan & Plate Feeders  
"AMSCO" Steel Pan Feeders  
Ship Loading Boom Conveyors  
Stacking Conveyors  
Storage & Reclaiming Systems  
Flight & Chain Conveyors  
Screw Conveyors  
"Natural Frequency"  
Vibrating Conveyors

REDLER Conveyor-Elevators  
ZIPPER Conveyor-Elevator  
Conveyor Belt Cleaners  
Headshaft Holdbacks  
Grizzlies & Screens  
Centrifugal Pilers  
Bin Gates & Tunnel Gates  
Car Pullers & Spotters  
Hoists & Winches  
Bucket Elevators  
Skip Hoists

Baltimore and Ohio cars wait on a double track rail spur to receive a complete shipload of imported ores within 24 hours of ship arrival at the new ore docks at Curtis Bay, Maryland. The S-A installation features four foot wide belt conveyor and several manganese steel pan feeders.

**STEPHEN S-ADAMSON**  
MFG. CO.

52 Ridgeway Avenue, Aurora, Illinois

Los Angeles, Calif., Belleville, Ontario

Write for a bulletin on any of the above

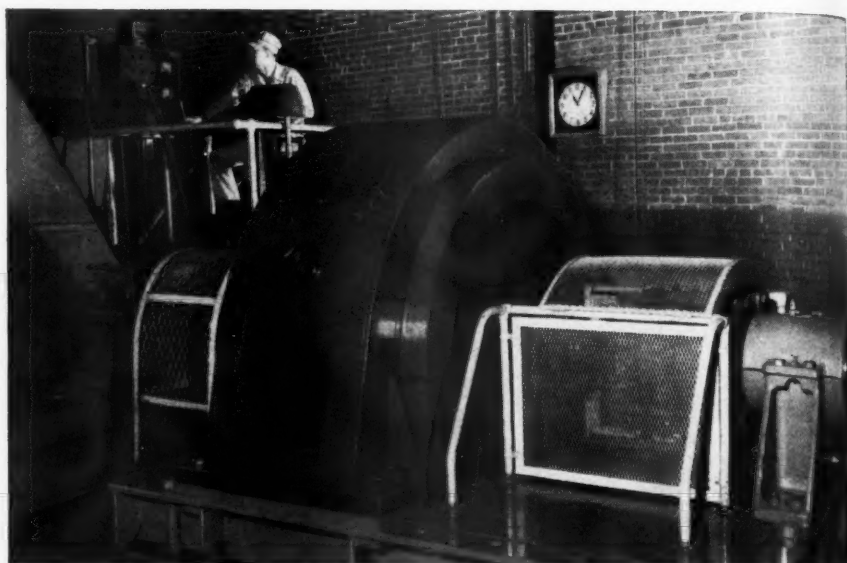
DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT



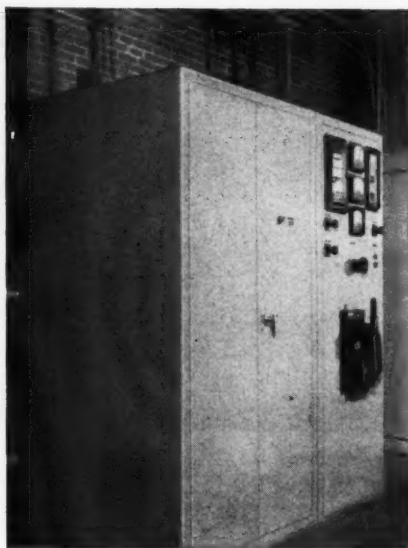
# Mine output gets a lift with G-E hoist drives

265-foot  
shaft...

450 trips  
per day!



In this Pennsylvania coal mine the coal hoist averages 450 trips every 24 hours, working two eight-hour shifts a day. Its G-E hoist drive helps maintain output because it provides high service continuity, needs only minimum maintenance. Shown here is the G-E 500-hp 2200-volt induction motor driving the hoist.



This G-E metal-enclosed primary control panel in the same mine incorporates the line circuit breaker, providing emergency disconnecting, and the primary reversing contactors. Completely wired and factory-assembled for quick, easy installation, this packaged unit includes everything needed.

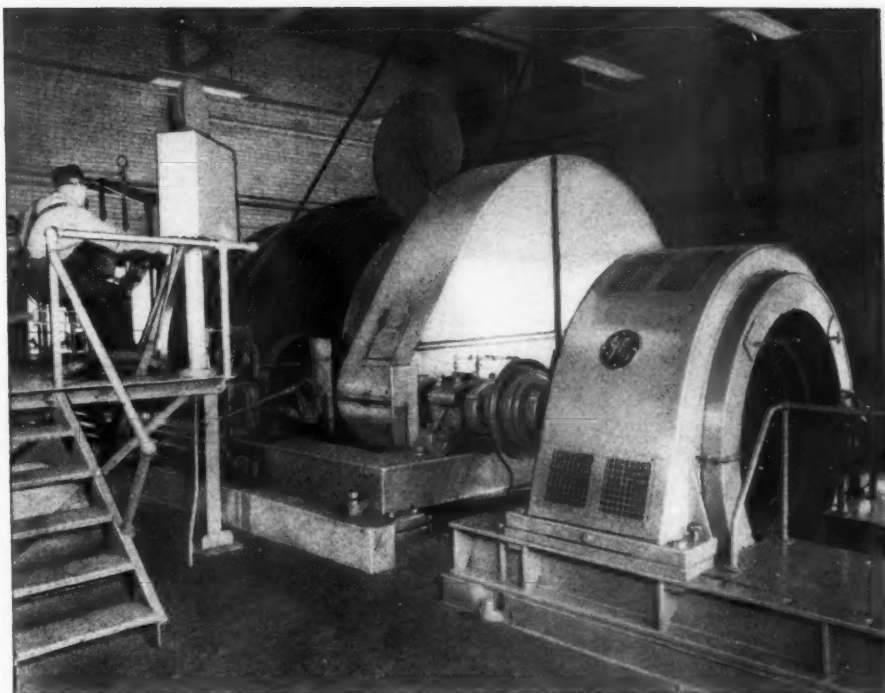
G-E secondary control, shown at right, includes secondary resistors and accelerating contactors, enabling the operator to properly accelerate and decelerate the hoist motor with the master switch.



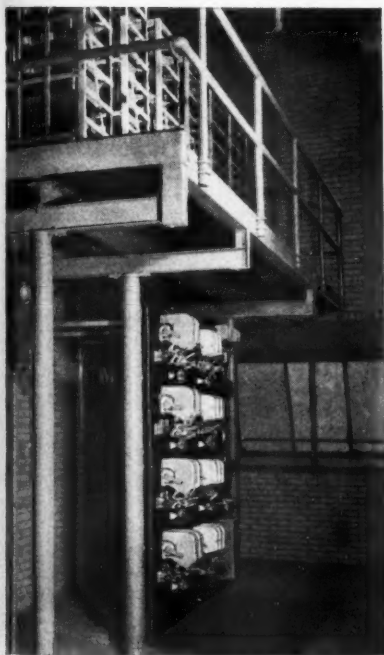
GENERAL  ELECTRIC

**500-foot  
shaft...**

**888 trips  
per day!**



In this large West Virginia coal mine, a G-E equipped coal hoist was recently installed to increase output. Hoisting 7100 tons of coal plus 1000 tons of slate mined per day, it makes 888 trips per 14½-hour day up a 500-foot shaft. The G-E 800-hp 2200-volt a-c hoist motor shown here is giving top day-in-day-out service.



Secondary resistors for this hoist are balcony-mounted above the secondary control, providing a space-saving, out-of-the-way installation. Primary control panel (not shown) was also supplied by G.E.

To improve power factor in the mine, this G-E metal-enclosed Pyranol® capacitor equipment—rated 540 kvar, 2400/4160 volts—was also installed. G-E capacitors reduce power costs, release system capacity, improve voltage levels and cut power losses. With no moving parts, they need practically no maintenance.

\*Reg. trademark of General Electric Company

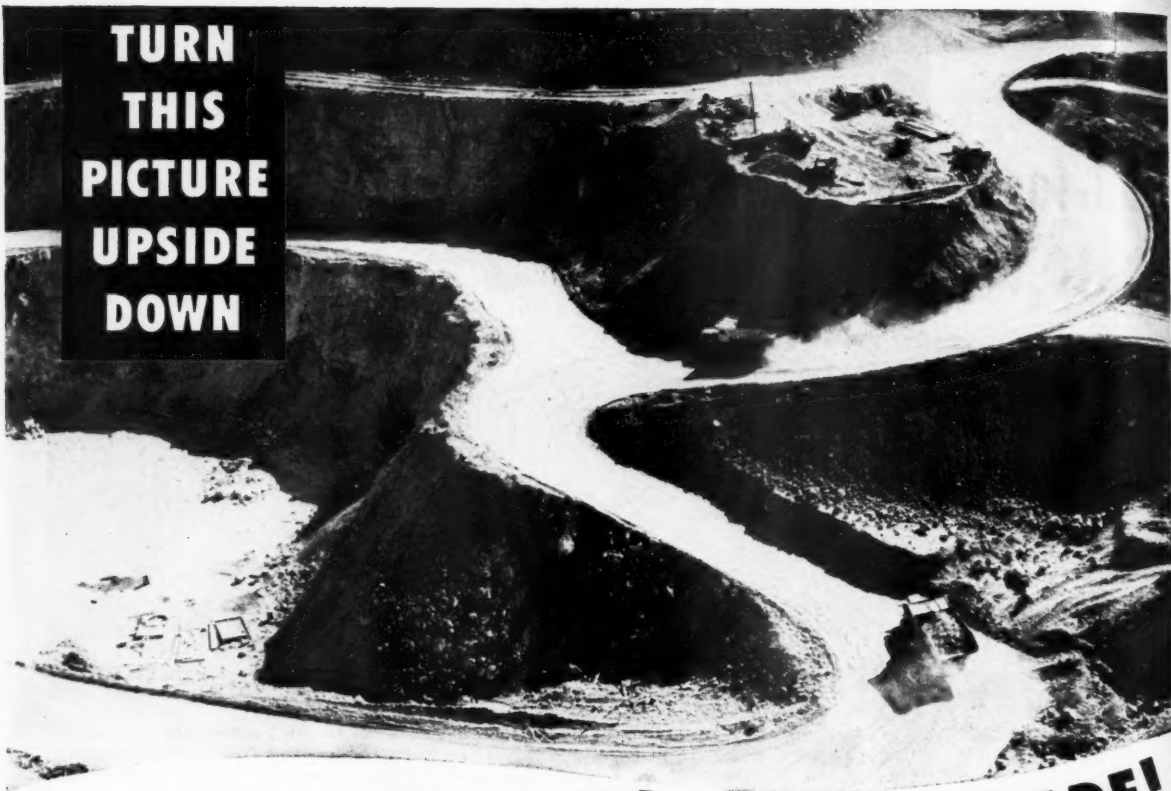


## Mine-Hoist Drives

**... to cut mining costs!**

These are only two of over 900 G-E large mine-hoist drives now in service, helping to raise mine output and lower hoisting costs. For skilled help on your mine-hoist drive—whether it's a-c or d-c—call a G-E mining specialist at your nearest G-E office. General Electric Company, Schenectady 5, N. Y.

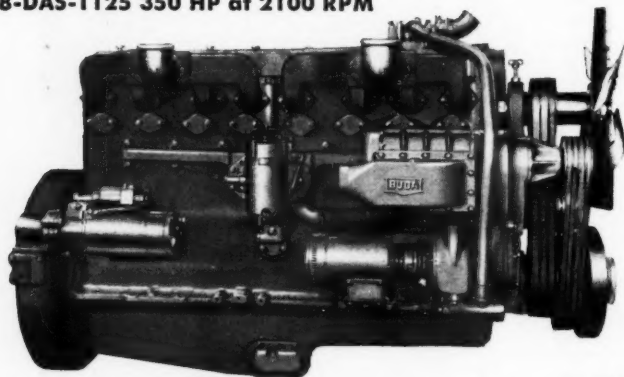
**TURN  
THIS  
PICTURE  
UPSIDE  
DOWN**



**Any way you look at it... IT'S A TOUGH GRADE!**

**yet BIG BUDA diesels  
are cutting haulage  
costs every day!**

**8-DA5-1125 350 HP at 2100 RPM**



**Whatever your power requirements, there's a money-making Buda dyna-swirl Diesel to fit your needs. See your nearby Buda Distributor today. Write for Bulletins and data. The Buda Company, Harvey, Ill.**

BC-18

14 Buda-powered haulage units are roaring up this tough grade . . . 2/10 of a mile with 5 switchback turns . . . hauling payloads up to 22 tons in faster time at a considerable reduction of their former cost.

The extra horsepower and 13 to 25% more displacement . . . greater lugging ability with 9 to 23% more torque of BIG Buda Diesels is paying off at this Bagdad Copper Corp. pit in higher production and lower costs. In many instances, the Budas are going more than 6000 hrs. before overhaul—another factor in lowered costs.



Buda powered Dart dumping at the crusher.

**BUDA**

Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment



# *It's New!*

## **Le Roi-CLEVELAND**

### **S11ST Offset Telescopic Leg Stoper**

# *It's Fast!*

**...and sized right**

**3 Sizes - 28" - 40" - 52" Feeds**

# *It's Tough!*

Built right by the leading  
manufacturer of offset  
and roof-bolting stopers!

S11ST Stoper lengths  
range from 23" closed  
to 84½" open.

#### **Only Le Roi-CLEVELAND S11ST gives you all these features for dependable, low-cost drilling**

- ★ Convenient right-hand feed control provides the right feeding pressure for fast drilling in any rock.
- ★ Trip rotation release allows piston to strike straight, hammer-like blows.
- ★ Feed leg supported at backhead and chuck housing for extra strength.
- ★ Fewer packings to replace in air-feed leg means less trouble, easiest servicing.

★ Button in handle provides fast, positive feed release, for quicker, easier steel changing.

★ Constant blowing around front end prevents slush and cuttings from entering drill at front end and greatly reduces wear.

★ Water tube can be removed quickly — you don't have to dismantle the machine, just take off the backhead plug.

★ Shielded safety handle protects operator's hands.

★ Air consumption is low.

Standard Le Roi-CLEVELAND S11 Offset Stoppers can be converted to this new telescopic type.

So get set for faster drilling and lower costs — standardize on these new stopers. Write for complete details.



## **LE ROI COMPANY**

CLEVELAND ROCK DRILL DIVISION  
12500 Berea Road, Cleveland 11, Ohio

# DU PONT ANNOUNCES

## an entirely new type blasting machine

**GREATER CAPACITY**

**GREATER DEPENDABILITY**

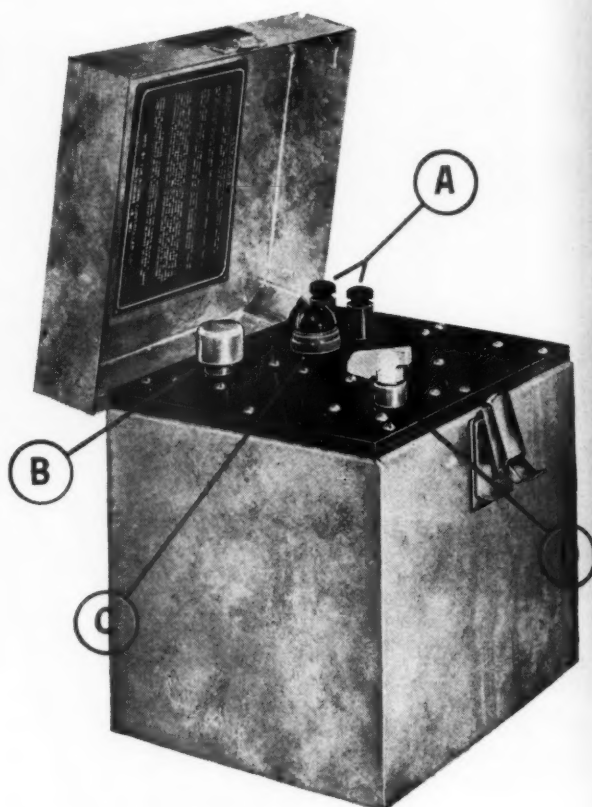
**GREATER SAFETY**

This latest product of Du Pont Explosives Research is a newly designed, portable, condenser discharge type blasting machine. In two models: CD-45 and CD-30.

Both machines have exceptionally high capacity. The larger (CD-45) is the most powerful built to date. Both machines easily fire small tunnel rounds in straight parallel... sizable rounds in straight series... and a surprisingly large number of caps in parallel series.

These new machines have been thoroughly tested in various kinds of operations throughout the country and have been found suitable for every conceivable type of blasting job, either on the surface or underground. The number of caps fired is not dependent on the physical effort applied by the operator, and the machines contain no moving parts.

Several built-in safety features provide maximum protection at all times. A group of long-lasting, radio-type B batteries are used to charge a number of condensers. At the moment of firing, these condensers deliver a powerful, instantaneous surge of power to the blasting circuit. The terminals are dead at all times except at the instant of firing and can never be made alive unless the operator has both hands on the controls and really means to fire the shot.



### THEY'RE SIMPLE TO USE:

1. Connect wires to terminal posts "A" shown in photo above.
2. Depress charging switch "B" and hold until neon pilot light "C" shines brightly.
3. Still holding charging switch down... move firing switch "D" to "on" position. This action fires the charge. Terminals are energized only at the moment of firing... absolutely removing risk of a premature blast. It's as simple as that!



### SPECIFICATIONS

The new Du Pont blasting machine is available in two compact models encased in rugged, waterproof, electroplated metal boxes:

#### MODELS

#### CAPACITY

straight series

		straight series			
		primary blast	secondary blast	straight parallel	parallel series
CD-30 (small)	wt. 24½ lbs. length 9½ inches width 9½ inches height 10½ inches	50	125	25	480 (12 series of 40 each)
CD-45 (large)	wt. 31 lbs. length 11 inches width 9½ inches height 11½ inches	50	200	50	1200 (30 series of 40 each)

**ASK THE** Du Pont Explosives representative in your area for complete information about this new, safer, more dependable, high-capacity blasting machine. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

## DU PONT EXPLOSIVES

*Blasting Supplies and Accessories*



150th Anniversary

BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY



## Beats weather on tough lube job!

● Rain and snow washed the lubricant from the dipper stick and pinion gears . . . hot weather caused it to "melt" and run off. That meant that operators of this shovel used in a northern open pit mining project had to take time from every shift to apply new lubricant. The cost in operators' time and in lubricant was excessive. Dripping grease was untidy and unsafe.

Asked for his recommendations, a Standard Oil lubrication specialist suggested HD CAM AND GEAR LUBRICANT. The dipper stick and pinion gears were steam cleaned. The recommended lubricant was heated and brushed on in a smooth, even coating. HD CAM AND GEAR LUBRICANT has stayed on the job in all kinds of weather, and the lubrication period has been extended from a single shift to as long as two weeks. Dripping has been eliminated, lubrication costs have been cut.

### HD CAM AND GEAR Lubricant

The experience of this mining company points the way to savings you can make through the use of Standard Oil's lubrication engineering service and high quality products. How you can easily and quickly put this lubrication service to work for you is explained at the right.

Standard Oil Company, (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

*What's your  
problem?*



C. F. Klenner, of Standard Oil's Duluth office, is the specialist who was called in by operators of this mine to help solve their lubrication problem. His practical experience and special training enabled him to recommend a lubricant that did the required job.

C. F. Klenner is one of a corps of Standard Oil lubrication specialists located throughout the Midwest. These men are especially trained to help you with your industrial or mining lubrication problems. To obtain the prompt, on-the-spot services of an experienced lubrication specialist, phone or write your local Standard Oil Company office.

When the specialist calls, discuss with him the benefits offered by such products as:

**STANOIL Industrial Oils**—Simplify your lubrication jobs by using this one line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

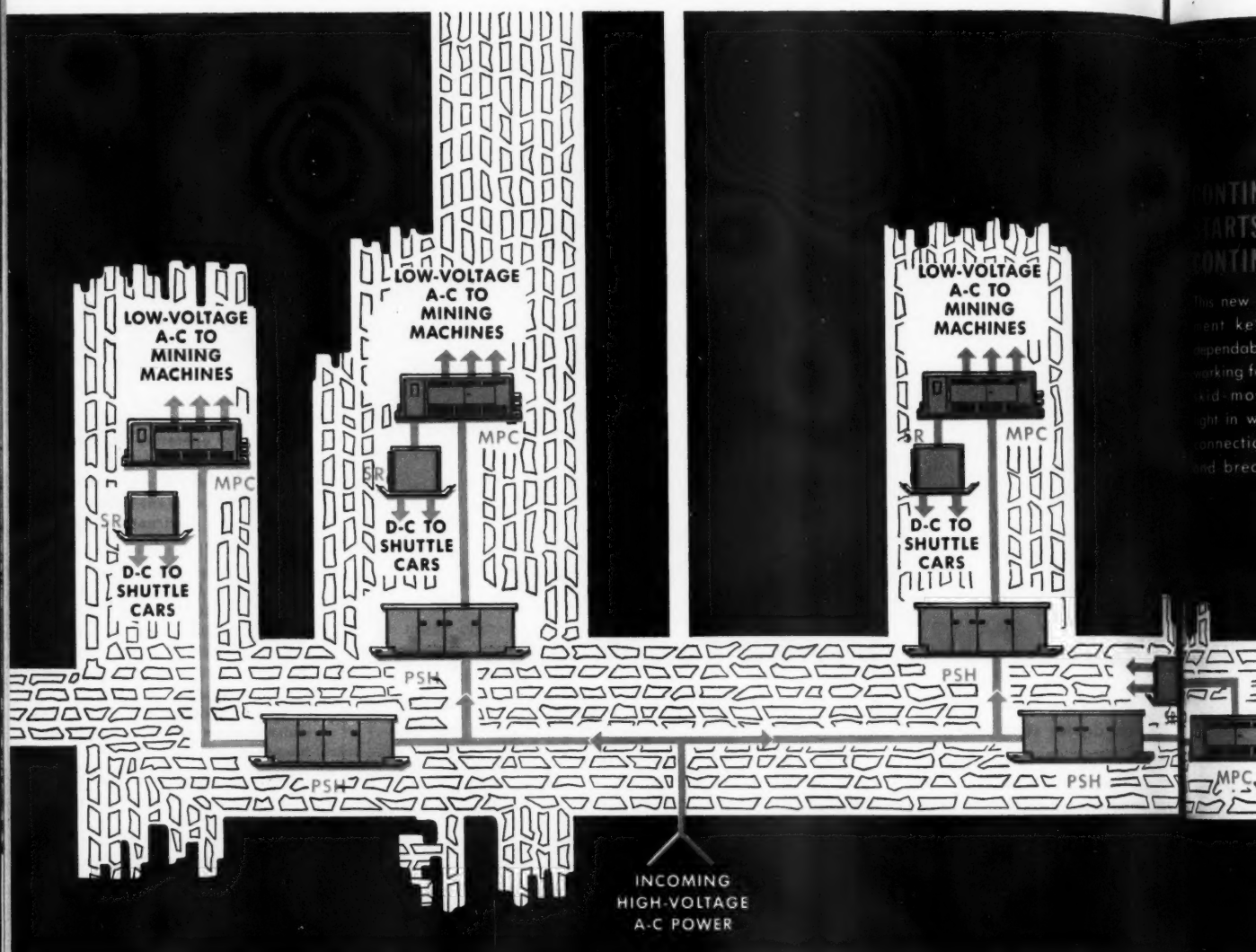
**SUPERLA Mine Lubricants**—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

**STANDARD OIL COMPANY**

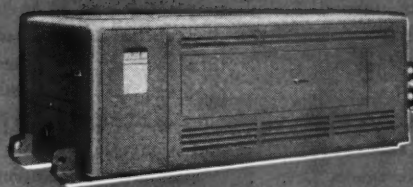


(Indiana)

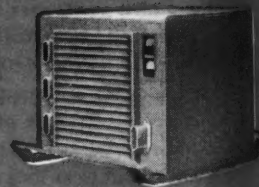




PSH—Portable Switch-house



MPC—Mine Power Center



SR—Selenium Rectifier

# Three new developments for A-C power systems

Here's the latest and best in power supply for a-c mining—three brand-new Westinghouse developments for use underground. Chart at left shows how they're applied.

## 1. New switch-house controls high-voltage power

High-voltage power comes down a shaft or borehole, then is sent out through individual feeders to the various working areas. Each feeder should be protected. Best way: the new Westinghouse underground switch-house. It immediately isolates the feeder in event of ground-fault, overcurrent or short circuit so that the rest of the system isn't affected.

## 2. Mine Power Center transforms it down

This new Mine Power Center keeps power supply where it's needed—close to the working face. Four working areas and four Power Centers are shown at left. This new unit is basically an air-cooled transformer with outgoing low-voltage feeders. A circuit breaker protects each feeder against overcurrent and ground-faults.

## 3. New rectifier supplies small blocks of d-c

Here's the ideal way to supply the small amounts of d-c needed in a-c mines. The new Westinghouse selenium rectifier takes a-c from the Power Center and supplies d-c through circuit breaker protected outlets. There are no major moving parts in this unit—the rectifier itself is a simple, static, plate-type device.

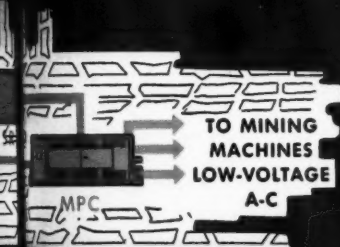
## Call Westinghouse early on EVERY job

Westinghouse has a great deal of experience in all types of electrical equipment for mining. We can help you cut costs and improve your operations. When your next project comes up, call your Westinghouse office early in the planning stage. And for more information on these three new developments, write for B-5423. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

J-94901

### CONTINUOUS MINING STARTS WITH CONTINUOUS POWER

This new Westinghouse equipment keeps power supply dependable—keeps it near the working face. All three units are air-mounted, compact and light in weight. The electrical connections are easy to make and break.



YOU CAN BE SURE... IF IT'S  
**Westinghouse**

EQUIPMENT FOR  
THE MINING INDUSTRY



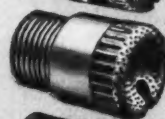
# For DIAMOND DRILLING SUPPLIES ... depend on **Longyear**



**WATER  
SWIVELS**



**DRILL RODS  
and  
ROD COUPLINGS**



**DIAMOND  
BITS and  
REAMING  
SHELLS**

TRIED AND PROVEN FEATURES, developed through extensive field experience, are continually being incorporated into all Longyear drilling supplies. Whatever your requirements—core barrels or water swivels, drill rods or safety clamps—you can depend on getting the best when you specify . . .

## **Longyear** DRILLING SUPPLIES

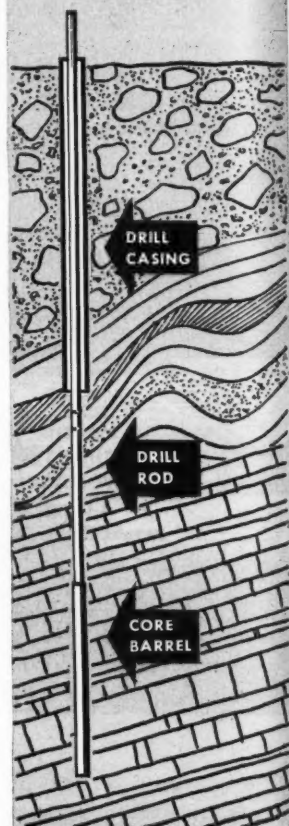
- Bits
- Casing
- Core Barrels
- Core Lifters
- Core Splitters
- Deflecting Wedges
- Drill Hole Surveying Instruments
- Drill Rods
- Fishing Tools
- Hoisting Plugs
- Pressure Packers
- Safety Clamps
- Sampling Equipment
- Water Swivels

YOU CAN DEPEND, TOO, on getting the best of diamond bits promptly from Longyear's complete stock of standard core bits, casing bits and shoes and reaming shells. Selected stones, carefully set for maximum efficiency assure you of bits that will cut faster and last longer. Thereby you reduce your over-all costs. Special diamond bits can be obtained on order.

• Longyear engineers, qualified by years of experience, will help you select the tools best suited to your operation. For prompt attention to your requirements write to us TODAY.



**SAFETY CLAMPS**



## **E. J. LONGYEAR COMPANY**

MINNEAPOLIS, MINNESOTA, U. S. A.

NEW YORK OFFICE, 1775 BROADWAY

**CANADIAN LONGYEAR, LIMITED, NORTH BAY, ONTARIO, CANADA**

DIAMOND CORE DRILLS • CONTRACT CORE DRILLING  
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES.



# up to 25% more production

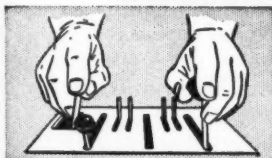
## LINK-BELT SPEEDER with *Speed-o-Matic* controls



Dipple and Dipple, Morgantown, West Virginia, with millions of yards to handle, use five Link-Belt Speeders. This K-370's

full hydraulic controls mean a fast, smooth digging cycle—fewer service problems—increased production up to 25%.

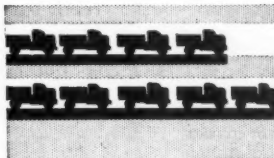
*Speed-o-Matic* full hydraulic controls means stepped-up production



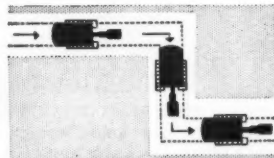
**Speed-o-Matic Controls**—fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



**Eliminates up to 150 parts**—cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."

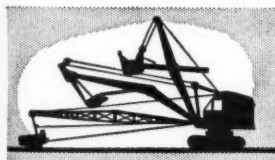


**Up to 25% more production**—fast operating cycle steps up output and profits. Effortless control keeps operator fatigue down.

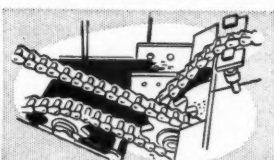


**Turns on a Dime.** Either track can drive or be locked independently. Hydraulic control gives instant response.

Here are other Link-Belt Speeder **PLUS** FEATURES that work for you



**Convertibility**—designed for peak production as shovel, crane, dragline or trench hoe. Convert in field—quickly, easily.



**Independent Chain Crowd**—is fast and positive. Self-adjusting to all boom angles. No cables to break, slip or adjust.



**High Ground Clearance**—eliminates snagging or fouling in rough areas. No projecting castings or easily damaged parts.



**Service**—fast, efficient. Link-Belt Speeder Service is nationwide—near you with replacement parts, factory-trained mechanics.

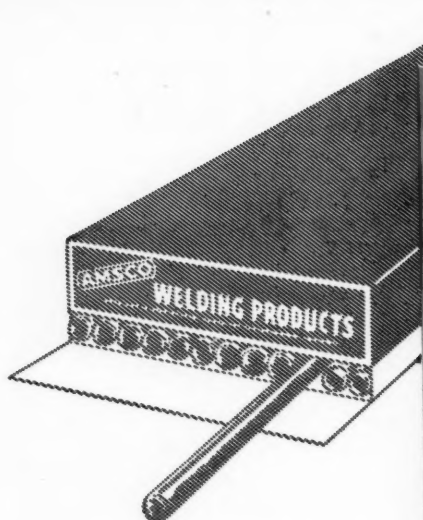
## LINK-BELT SPEEDER

CORPORATION

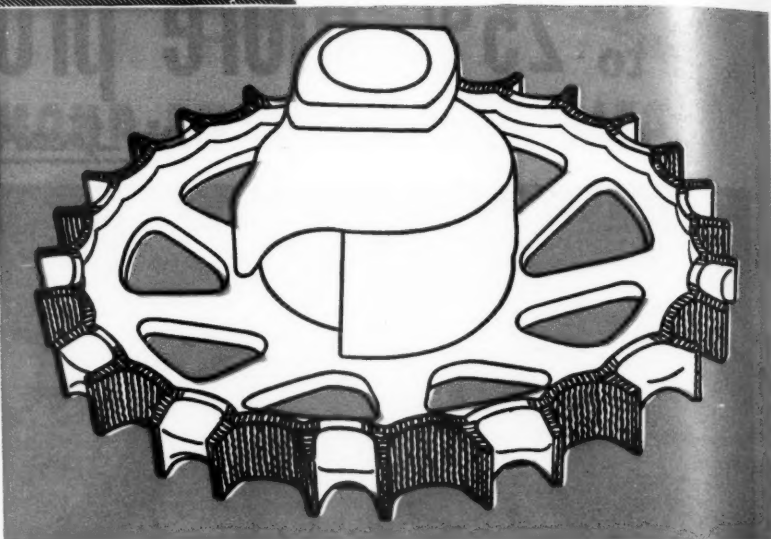
12,744

Builders of the most complete line of shovels, cranes and draglines

CEDAR RAPIDS, IOWA



How AMSCOATING with Amsco  
Hardfacing Rods saves you materials  
... manpower ... money.



## These teeth take bites out of repair costs!

### AMSCOATING...stands for control of wear by Hardfacing...

Hardfacing rods—and recommendations for their use—are as sound as the manufacturer who makes them. AMSCO has been fighting wear for a half-century—first with Manganese Steel, and later with AMSCO Hardfacing Products.

If you have a problem of wear caused by impact, abrasion, heat or corrosion ...

Find out how AMSCOATING can save you materials ... manpower ... money!

*AMSCOATING can make old Tractor Drive Sprockets last 3 times longer than new.*

Here's another way to beat the high cost of replacements, down-time and maintenance ... AMSCOATING the teeth on Tractor Drive Sprockets. Time after time service records have shown that AMSCOATING of sprockets results in these dollar-saving advantages:

1. *On an average — 3 times the service life of a new, unhardfaced sprocket.*
2. *2 out of 3 sprocket changes completely eliminated ... far less down-time, less maintenance ... more equipment out of the shop and on the job.*

To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again ... *at about half the cost of a new one!*

Get all the facts on how to make these big savings ... write today for instruction sheet on AMSCOATING sprockets, and the name of your nearest AMSCO Distributor.



# AMSCOATING

THE RIGHT WAY TO SAY HARDFACING

AMERICAN

**Brake Shoe**

COMPANY

## AMERICAN MANGANESE STEEL DIVISION

422 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.  
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

## When are carbide insert bits best?



**W**HEN you run into drilling conditions like those listed below, you need carbide insert bits. Because carbide insert bits drill longer without sharpening, drillers spend less time changing bits. Crews can spend more time drilling. Bit reconditioning is simplified. And since carbide insert bits hold their gauge better, you can bottom the hole in the desired size without having to remove excess rock.

1. Extremely deep holes
2. Very hard ground where a steel bit will not drill out a full increment of drill steel.
3. Small blast holes
4. Constant gauge holes
5. Extremely abrasive ground
6. Block hole drilling in hard ground
7. Raise mining where space is limited
8. Locations where transportation and reconditioning of bits are problems.

## What's the best carbide insert bit to buy?

**T**O be certain of getting the best carbide insert bits, look for the trade-mark "Timken" on the bits you buy. Timken® carbide insert bits are removable, screw on or off the drill steel easily. Driller is assured of sharp, uniform bits at all times without exchanging entire drill steel. And he can conveniently carry a full day's supply of bits.

You'll get more service from your Timken carbide insert rock bits because the bit body

is made from electric furnace Timken steel. And because of the special shoulder union developed by the Timken Company, threads are not subjected to drilling impact. Timken carbide insert bits are available in six series. Our Rock Bit Engineering Service will help select the right one for your job. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



"SC" SERIES  
( $\frac{3}{8}$ " thread)



"FC" SERIES  
( $\frac{3}{8}$ " thread)



"MC" SERIES  
(1" thread)



"MCA" SERIES  
(1" thread)



"DC" SERIES  
(1 $\frac{1}{8}$ " thread)



"DCA" SERIES  
(1 $\frac{1}{8}$ " thread)

# TIMKEN REMOVABLE ROCK BITS

TRADE-MARK REG. U. S. PAT. OFF.



# McCarthy Drills

## CUT DRILLING COSTS!

### BLAST HOLE DRILLS

Extra heavy-duty units compactly designed bore blast holes faster with less effort because of greater power and finger-tip hydraulic feed.

Choice of gasoline, diesel or electric power units drive interlocking-auger sections to any required depths through shale, sandrock, soft limestone and other earth formations.

Vertical and horizontal models are built for individual or cluster mountings on all types of mobile equipment. And there's a highly maneuverable, self-propelled unit specially designed for "close in" horizontal drilling.

Write now for full information on how these rugged work horses can help you hit pay dirt faster.



Model 106 Vertical Drill

*Heavy  
Rugged  
Powerful*

### COAL RECOVERY DRILLS

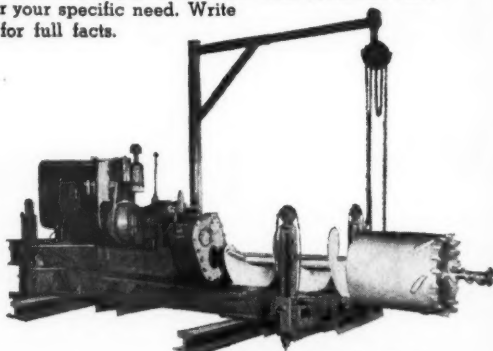
McCarthy Coal Drills bite into the seam's heart to pull out clean, valuable lump or slack coal with minimum effort, minimum cost.

Near Salineville, Ohio three men use one machine with 24-inch diameter augers to produce 90 tons of coal daily. At Germano, Ohio the same number of men use 36-inch diameter augers to produce 167 tons per day!

The rugged McCarthy Mineral Recovery Drills produce coal at \$1.50 to \$2.00 per ton, including amortization of investment cost. These hydraulically controlled units operate on gasoline, diesel or electric power.

Choose from 4 models. 4 to 24-ft. interlocking-auger sections are available in 20, 24, 30, 36, 42 and 48-inch diameters. Jacks are power operated.

McCarthy dealers can show you many testimonials or installations and help you make the most profitable selection for your specific need. Write today for full facts.



36" Coal Recovery Drill



SALEM

MANUFACTURED BY

# THE SALEM TOOL CO.

## ✠ Editorials ✠

VOLUME 38

JOHN C. FOX, Editor

Number 3

### Neither Log Nor Crane

SETTLEMENT of the long and bitter strike at Hanover, N. M. was announced recently after irreparable loss of vital zinc metal to the national economy and untold hardships and deprivations suffered by the striking miners and their families. The terms of the settlement, agreed upon at a three-day meeting in El Paso called at the request of Union officials, are essentially those offered much earlier by the company.

This strike was led by the same group that struck the potash mines in the Carlsbad district late in 1949. In neither case did they get for their followers anything that the mining companies had not offered long before the final capitulation of these leaders. In both cases the loss in production and the loss in wages to the workers can never be made up.

When will the members of unions actively demand to know whither they are being led, and for whose benefit? It is questionable whether many strikes, supposedly called at the behest of the rank and file, would be called if the strike vote were taken by secret ballot. The vote by a show of hands is a powerful weapon when used unscrupulously. It makes voting a travesty on democratic principles when fear of reprisal dictates how a member shall vote. Certainly experiences such as these should teach the value of honest collective bargaining, without the hysteria that exposes women and children to the dangers of mass picketing.

The open flouting of the law by strike leaders should be an indication of the irresponsibility of those who seek to mislead honest workmen in quest of personal aggrandizement.

That the entire labor movement is not led by such trouble mongers is a blessing recognized by all. Organized labor has come a long way since the early days. But the progress has not been the result of leadership like that experienced by the frogs in Aesop's fable. They petitioned Jupiter for a king to rule their pond. When he sent a log to fill the role, they were dissatisfied because it did nothing, and begged for a more active ruler. Jupiter obliged by sending a crane who immediately started to gobble up his subjects. In desperation they pleaded that both the log and the crane be removed, allowing a return to their former state of self rule.

This country needs every pound of metal and nonmetallic mineral it is possible to produce and labor must not, in the guise of seeking more money or better working conditions, sabotage the mobilization of industry. To do so might pave the road to a thralldom for labor like that in Russia and her satellites, and the loss of everything the American workman holds dear.



New series of tests in drifts will compare drifter drills



Three year trend shows today's bits are better

# Economic Limit of Lightweight Drilling Equipment

WITH the general acceptance of tungsten carbide and one-use bits by the metal mining industry in recent years, the problem of balancing the drilling equipment to these bits presented itself. As these new type bits permitted the drilling of a hole of smaller diameter, the continued use of heavy stoppers and heavy drifters appeared to be inconsistent.

Prior to the adoption of tungsten carbide bits at the Iron King mine, we started our holes using a 2½-in. detachable steel bit. This large bit necessitated the use of the heavy 116-lb stopper and the drifter with the 3½-in. piston. At that time we were using one-in. quarter octagon carbon drill rods in the stoppers and 1¼-in. round steel in the drifters.

Three years ago drilling was completely converted to tungsten carbide bits and alloy drill steel. The results of test work, and the record of bit usage for the first two years were outlined previously in a paper read by the author. At this point it is sufficient to note that conversion resulted in approximately 100 percent more ore mined per shift; that the miners' bonus was increased 60 percent, and to round out a rosy picture, the bit manufacturers were able to

## Key to Drilling Economy Lies in Proper Balance of Machine, Drill Rod and Bit

By A. J. ZINKL

Assistant Superintendent  
Iron King Mine  
Shattuck-Denn Mining Co.

extract about 30 percent more revenue on bit sales.

The possibility of replacing worn drilling equipment with lighter-weight drills appeared logical and led to a series of tests to determine the size

While conducting these tests a record was kept on all factors influencing the over-all cost picture. Drilling speeds were determined in feet per shift, rather than in inches per minute, as the ease of handling the lighter

Steel	Bits	77 lb Stoper	98 lb Stoper	116 lb Stoper
1-in. Qtr. Oct.	1½-in.	1	5	9
	1½-in.	2	6	10
¾-in. Qtr. Oct.	1½-in.	3	7	11
	1½-in.	4	8	12

drill with which Iron King ore could most economically be mined.

By combining three sizes of stoppers, two sizes of drill steel and two sizes of bits, 12 separate tests were conducted. These tests were designated according to table No. I:

machines and smaller steel would be more pronounced in a shift than over a few minutes. Bit and steel failures, the footage represented by the failures, and the type of failure were all recorded.



## Steel Bound in Hole

In the tests number 1, 5 and 9, which combined the 1½-in. bit with the one-in. drill steel it was learned after a few hundred feet of drilling that regardless of machine size, this pairing was wrong. The clearance after the bit lost some gauge was so little that the steel was continually binding in the hole. This meant real drilling trouble, reflected in fewer feet of hole drilled per shift. On this basis, further test work on these three tests was discontinued.

Tests numbered 2 and 4, combining the 77-lb stoper with the 1½-in. bits were also discontinued after several hundred feet of drilling. The footage per shift was low, in fact it was but little better than drilling with detachable steel bits.

The tests combining ¾-in. steel and 1½-in. bits, namely those numbered 4, 8 and 12, permitted a clearance that was greater than necessary to drill satisfactorily. However, experiments were continued with this combination to gain more information on the machines. In so doing, it was learned quickly that the pairing was poor. Excessive thread trouble on both bits and steel, as well as trouble with the bits ringing off, or skirt breakage at the base of the thread developed. As near as could be determined the additional flexibility in the ¾-in. rods set up fatigue strains in both steel and bit which caused undue breakage

and trouble at these points. Regardless of the reason, this combination gave only 70 percent of the footage obtained with the larger rod sections.

The results of the remaining four tests, representing over 10,000 ft of drilling and the destruction of 80 tungsten carbide bits are recorded on table No. 2. Also included in this tabulation are figures representing former practice of drilling with the detachable steel bits and carbon drill rods. These figures in the first column have been revised to present-day costs for purposes of comparison.

The cost per ton, or economy, of lighter weight drilling equipment with the correct steel and bit combination is analyzed in this table.

The outstanding reason for converting to tungsten carbide bits at the Iron King is shown in the figures representing tons mined per shift, and in the reduction of the stoping labor cost per shift. The tonnage per shift is double or better at present than when using former equipment. The figures at the bottom of the columns representing total labor cost per ton reveal an average savings of from 20 cents to 25 cents. The supply cost for carbide bits is about 10 cents per ton higher, but considering the overall picture this is well worth while.

## Drill Can Be Too Small

All four of these tests produced results considerably better than past practice. How much better is reflected

in using the best combination of drill, steel, and bit. These tests proved conclusively that too small a drill can be used, and that it cannot be assumed that small drills will drill these small holes better, or even as well as a larger machine can do the job. At the Iron King that assumption is not true.

In test No. 3, which combined the smallest stoper with the smaller steel and the smaller bit, only 54 tons of ore were drilled per shift. This is too much less than the other machines can drill to consider it as replacement for present equipment. Individually, some of the other figures in this test are excellent. Bit and steel footage records with this little stoper were good, being equal to, or better than the other steel and bit footages. The bit failure records definitely showed more bit worn out and less discarded for other reasons. However, these figures were not enough to offset the slower drilling by this machine which resulted in only 54 tons per shift.

The loss of over 50 cents per shift in bonus payment to miners is another factor which must be considered in rejecting the smaller machine. If these men were only on day's pay, it is realized they would be enthusiastic about using the lighter weight, easy-to-handle 77-lb stoper. However, under the present bonus system it is impossible to get the men to use the little machine without supervisory pressure.

While the drilling labor cost accounts for most of the savings, other items slightly influence the total cost. The 1½-in. bits cost 9 percent less than the 1-in. bits. The ¾-in. drill steel will stretch out into 25 percent more feet per dollar than will the one-in. steel. Therefore, when the smaller bits and the smaller steel match the performance of the larger bits and steel, the savings are proportional to the initial cost.

## To Replace Worn Machines

The lighter steel and the smaller bits used in combination with the 98-lb stoper performed equal to the larger steel and bits, as far as bit and steel footage were concerned. The drilling speed of this test also produced more tonnage. Therefore as machines become worn and are discarded, they will be replaced by the 98-lb stoper. Stocks of one-in. alloy drill steel is sufficient to last another year and as it is best to use this size steel with the 1½-in. bit, that practice will be continued. However, at some future date a change will be made to the ¾-in. steel and the 1½-in. bit. Tests have been conclusive enough to permit outlining this program for future drilling.

The possibility of using still lighter weight equipment is always inviting. The ease of handling, the decrease in air consumption, the small initial out-

TABLE NO. II

	Former Drilling Practice	Test No. 10	Test No. 6	Test No. 7	Test No. 3
Drill .....	116 lb	116 lb	98 lb	98 lb	77 lb
Steel* .....	C 1-in.	A 1-in.	A 1-in.	A ¾-in.	A ¾-in.
Bits .....	2½-in. steel	1½-in. T.C.	1½-in. T.C.	1½-in. T.C.	1½-in. T.C.
Tons drilled per shift .....	32	65	65	70	54
Stope drilling costs per man shift (Includes overtime)					
Wages .....	\$13.39	\$13.39	\$13.39	\$13.39	\$13.39
Bonus .....	2.40	4.02	4.02	4.26	3.48
Total .....	\$15.79	\$17.41	\$17.41	\$17.65	\$16.87
Cost per ton					
Drilling:					
Wages .....	\$0.418	\$0.206	\$0.206	\$0.191	\$0.248
Bonus .....	0.075	0.062	0.062	0.061	0.064
Supplies:					
Steel .....	0.084	0.071	0.071	0.060	0.060
Bits .....	0.112	0.201	0.197	0.185	0.187
Drill shop labor:					
Steel .....	0.033	0.021	0.021	0.021	0.021
Bits .....	0.065	0.090	0.090	0.090	0.090
Stope repairs:					
Parts .....	0.039	0.033	0.030	0.028	0.027
Labor (Aug.) .....	0.048	0.048	0.048	0.048	0.048
Total .....	0.874	0.732	0.725	0.684	0.745
Total Labor .....	0.639	0.427	0.427	0.411	0.471
Total Supplies .....	0.235	0.305	0.298	0.273	0.274
	\$0.874	\$0.732	\$0.725	\$0.684	\$0.745

\* All steel hollow quarter octagon.

"C"—Carbon drill rod.

"A"—Alloy steel drill rod.

"T.C."—Tungsten carbide insert bit.

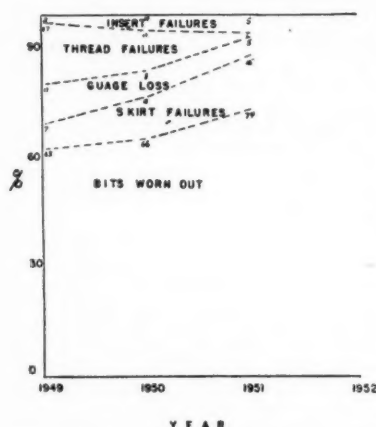
lay, and the smaller repair expense still sound like a good way to reduce drilling cost. However, until some combination of bit and steel with the smallest stoper can produce better tonnage in a shift, the conclusions of this test work will dictate practice.

### Review Past Performance

During the course of this latest test work records on the original test work on tungsten carbide bits, as well as records on drilling over the past three years were reviewed. The performance of 12,000 tungsten carbide bits and the drilling of over 1,500,000 ft of hole revealed several trends and changes which have occurred during the past three years. These trends affect drilling picture and are worthy of comment.

There are several methods of evaluating the performance of bits in addi-

### BIT FAILURES

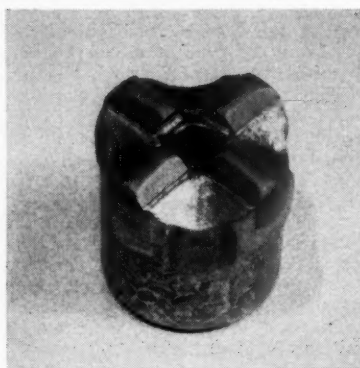


Trend over three years indicates present day bits are superior

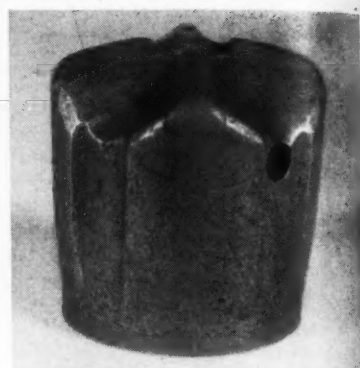
tion to the actual footage drilled. One method is in the analysis of the bits which have been discarded. Bits are segregated according to the reasons they failed. Five classifications are used: (1) Bits are worn out. (2) Bits are broken in the skirt. (3) Bit gauge loss is excessive. (4) Bit threads have failed. (5) Inserts have failed.

The accompanying graph indicates the trend over three years in an analysis of bit failures. This trend shows definitely that a better bit is being marketed today than three years ago. The most interesting figure is the additional number of bits worn out, as these represent the maximum amount of drilling without failure due to one of the other four reasons.

The other reasons for discarding a bit indicate possible corrections or changes that should be sought in the design of bits for use at Iron King Mine.



Seventy percent of bits discarded are worn out



Number of bits discarded for gauge loss has been halved

### Ore Is Very Abrasive

Originally the primary trouble at the mine was the excessive gauge loss on the bits. Iron King ore is a tough, cherty, highly abrasive sulphide which had caused an average gauge loss of .001 in. per foot of hole drilled. This figure was with four point bits. Today, due to better carbide, or possibly carbide built to different specifications, the number of bits we discard for gauge loss has been halved. This gauge loss is one of the reasons the chisel type bit cannot be used here. The carbide area exposed on the sides to take the gauge loss on a chisel bit is only about 65 percent of that on a four point bit.

Miners working in one particular vein take 4 or 5 racks, with 5 bits to the rack to drill approximately 160 ft of hole per shift. Each bit is capable of drilling 7 or 8 ft before it is dulled and needs refacing. The best performance in that vein is a total of about 40 ft of hole. Fortunately all the ground is not this difficult to drill.

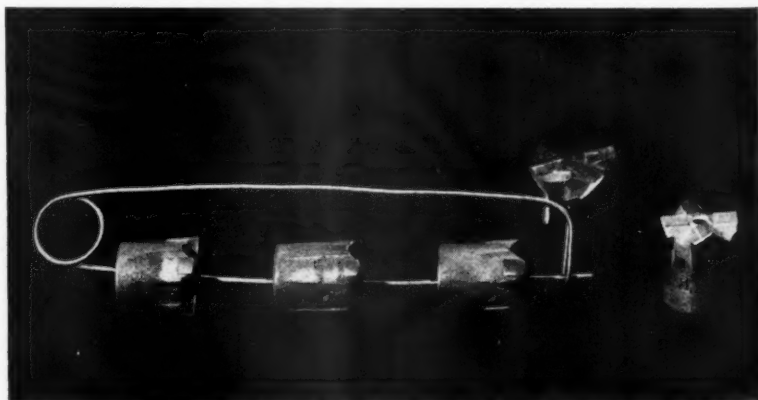
At the present time a series of tests are being conducted in the drifts. A smaller power-fed drifter with a 3-in. piston, using 1½-in. round alloy drill steel with 1½-in. bits is being tried.

This equipment will drill along with the regular drifter with the 3½-in. piston in about 85 per cent of the ore drifts, but in the other 15 percent of the drifts it will finish out the round about a foot short of the bigger machine with the same steel and bits.

Another part of this test has been to try 1½-in. bits on the larger machine. At present the indications are that a very slight sacrifice of drilling time will result in an over-all cost reduction from the additional 50 to 60 percent more footage obtained from the 1½-in. over the 1¼-in. bit.

In conclusion it can be stated that the key to better drilling economy is in obtaining the best balance between size of machine, size of steel and size of bit. It is not felt that even with a good combination of steel and bit, the newer lightweight drills will handle any kind of ground, but rather that present equipment is putting rock in the box at less cost than anything tried this far.

Acknowledgment is gratefully given for the helpful suggestions of H. F. Mills, manager of the Iron King Mine, and the assistance of Jim Kaess of Timken, Joe Tomkinson of Ingersoll-Rand, and Jack Hill, test engineer at the mine in the preparation of this paper.



Miners use four or five racks of five bits each to drill about 160 ft.



The portable emergency equipment is housed near the shaft bottom

# Fire Fighting Equipment and Facilities at Indianola

**Well Engineered and Well Maintained Equipment  
Paid for Itself in Just One Emergency**

**By G. D. WYANT**

*Superintendent  
Indianola Mine, Northern Coal Mines  
Republic Steel Corp.*

INDIANOLA MINE is located approximately 15 miles northeast of Pittsburgh, in what is known as the Allegheny Valley. The mine is operating in the thick Freeport Seam, which averages about 78 in. in height.

The coal bed is reached through two 200-ft shafts. One is used exclusively for hoisting coal and the other, a two compartment shaft, for hoisting men and materials and for a main return for the entire mine. Both the coal shaft and man-material shaft are on intake air.

## Use Discharge Pipe Line

A large drainage sump is located near the bottom of the man-material shaft and is dewatered by two 1200-gpm centrifugal pumps. These pumps discharge to the surface through a 12-in. line located in the return air shaft. In order to establish a permanent fire fighting system, four-in. pipe connections were installed in the bottom of the 12-in. discharge column, from which approximately 21,000 ft

of four-in. pipe line was laid along all of the main haulage roads and into the working sections. Mine water used in these lines has a pH of 6.0 and is therefore not injurious to the piping system. Fire plugs, with standard fire hose connections were installed at 1000-ft intervals along the main haulage roads. Each outlet is appropriately designated by a red light and a sign which reads "Fire Station." Threaded fire plug outlets are kept well greased to minimize corrosion and are equipped with a brass cap to prevent accidental damage to the threads. Pressure is maintained in the lines at all times either through operation of the two 1200-gpm pumps or the static head in the 12-in. shaft column. When the two shaft pumps are in operation, the pressure at the bottom of the 12-in. line is approximately 120 psi. In the event of a pump failure, power interruption or insufficient water in the drainage sump, a connection has been made at the top of the 12-in. discharge pipe where water from the

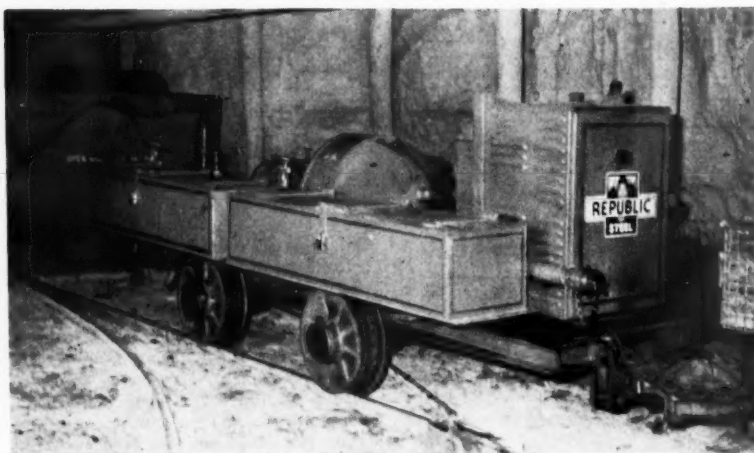
Oakmont Water Co. can be turned into the line if required. Based on the height of the water column in the shaft, the static pressure would be approximately 85 psi.

Discharge lines on all field pumps throughout the mine are equipped with a standard fire plug connection, located close to the pump. A valve is located outby the fire plug so water can be discharged through the plug when needed. All cutting and loading machines have a 15 lb CO<sub>2</sub> fire extinguisher handy to the controls and all main line locomotives are likewise equipped. Two-and-one-half gal soda-acid fire extinguishers are placed at strategic points in all sections. Two sacks of rock dust are kept at all pumps and at all ventilating doors where trolley wire passes through. Attached to all cutting machines are water cars with a capacity of 700 gal. A small single stage centrifugal pump with a capacity of five gpm at an 80-ft head is located on each car together with about 20 ft of ¾-in. hose equipped with a spray nozzle. Water from these cars is used primarily to allay dust while coal is being cut but the pressure developed by the small pumps also makes it possible to extinguish small fires before they become uncontrollable. Water for these cars is replenished as required at designated water stations in the various sections.





Fire plugs are installed at 1000-ft intervals along main haulage roads



A high pressure pump supplies water from the tank car or a sump



This 700-gal water car also carries a CO<sub>2</sub> fire extinguisher and several rolls of brattice cloth

## In Use Since 1949

Portable underground fire fighting equipment consisting of a train of three units was put in service in 1949. The first unit, a water car with a capacity of 700 gal is also equipped with a CO<sub>2</sub> extinguisher and several rolls of brattice cloth. The second or middle unit is a steel flat bottom truck. On it is mounted a high pressure turbine type pump direct connected to a 20-hp 1750-rpm dc motor together with the necessary starting equipment, fuse plugs, ground clamps and cables required for making speedy connections to power circuits anywhere in the mine. This pump, with a nozzle pressure of 100 psi, will discharge about 90 gpm through a 3/4-in. nozzle. Discharge lines from the pump are so arranged that standard fire hose can be attached at either end of the truck. A 50-ft length of three-in. high pressure rubber hose is permanently attached to the suction side of the pump, to which additional suction line can be added if necessary. This hose has adapter fittings so arranged that it may be coupled to the four-in. fire plugs along the haulage road to permit the pump to act as a booster or it can be used to pump directly from local sumps or other sources of supply. A permanent connection in the suction line can be used to pump water from the 700-gal water car, as a temporary measure, while fire hose is being connected to the regular fire plugs. Another connection in a line running from the pump to the water car permits refilling while the pump is being used as a booster or when it is pumping from sumps. Any excess line pressure that may be developed is controlled by a release valve located in the discharge line to the water car. The pump truck is also equipped with a portable telephone that may be tapped into the telephone lines at any point along the circuit. On the truck are two steel containers for storing saws, axes, wrenches, nozzles and other miscellaneous equipment. The contents of these containers are safeguarded by means of padlocks. Keys to the locks, kept in a glass covered case mounted on the truck adjacent to the tool boxes, are accessible when needed by merely breaking the glass. An electric strip heater is located on the bottom of the truck, near the 20-hp motor, to keep the motor dry and prevent any accumulation of moisture while the units are housed in the fire station.

The third unit is a double-deck steel truck used to carry 1200 ft of standard fire hose. The hose is coupled in one length on the upper deck and can be completely removed from the truck in a few seconds. Ten 10-ft sections of standard three-in. pipe are carried on the lower deck to be used for suction line extensions. Six timber jacks and a quantity of 2 by 4-

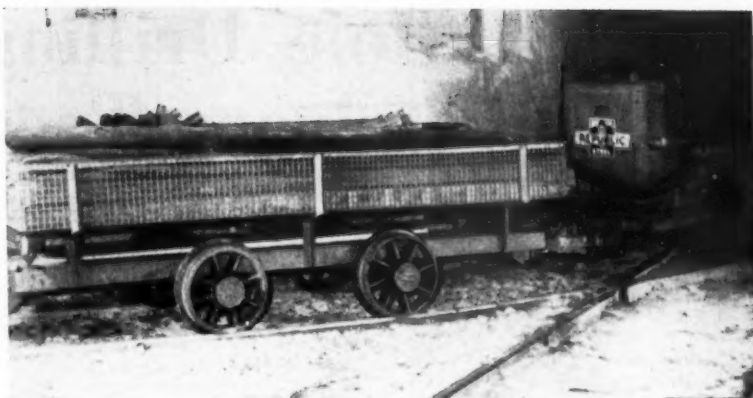
in. and 2 by 6-in. lumber is carried to be used for erection of temporary stoppings. Actual tests show that a four ply canvas stopping can be erected in about 1½ minutes.

### Trucks Easily Handled

All three trucks are equipped with automatic couplers and can be coupled to any mine car or locomotive. These units are housed in a special place near the shaft bottom adjacent to the mine repair shop. Trolley wire and a spur track has been extended into the fire station so that any locomotive can enter the building and couple to the fire fighting equipment without delay. Maintenance and operation are under the direction of the repair shop foreman and all shop personnel have been trained to handle the equipment. Periodic fire drills are held to insure perfect condition of the equipment. By these drills, the responsible men are kept familiarized with its operation.

### Equipment Tested

On Wednesday, May 24, 1951, there occurred an occasion to test the equipment on an actual mine fire and it proved to be highly successful. While a loading machine was loading out a cut of coal in the 10 South Section, the trailing cable became grounded on the reel. The resulting flash burned through the side of the reel and an adjacent hydraulic hose, spraying flaming oil over the discharge end of the loading machine. The CO<sub>2</sub> fire extinguisher, which is kept on the machine, and other extinguishers located in the section were brought into use. These extinguishers were effective and it was believed that the fire was practically out when gases from the oil suddenly burst into flame and forced the men from the place. A call was made to the inside repair shop and the portable fire fighting



Double-deck truck for pipe and fire hose

equipment was immediately rushed to the scene. Approximately 35 minutes elapsed from the start of the fire until the equipment arrived. By this time the fire had gained considerable headway. The fire pump was put into action immediately, using water from the 700-gal tank car. In the meantime, connections were made and hose was laid from the permanent water lines approximately 800 ft from the scene of the fire. When water was applied, a large quantity of steam was generated making direct contact very difficult. Heat from the fire caused the roof immediately above to collapse, completely covering the machine. The resulting smoke and steam filled the working place to a point 100 ft from the seat of the fire. Realizing that contact through this would be impossible with the ordinary fire nozzle, an adjustable fog nozzle was brought to use. The curtain of water produced by this nozzle acted as a barrier to the smoke and steam and permitted the men to advance under good roof to within 40 ft of the fire.

In one hour after water was first applied the fire was completely out

and the place was free from smoke and steam.

A fire fighting program of this type obviously requires considerable initial expense in the form of permanent pipe lines, adaptations to present pumping equipment and necessary portable equipment. Any expense at Indianola has been more than justified by this single experience.

Since the advent of this fire fighting equipment, a greater sense of security is evident at Indianola Mine, not only among the officials but with each and every man engaged underground. These men realize that all possible steps have been taken to give them protection against mine fires.

Much credit must be given to regular employees of the Electrical and Mechanical Department at Indianola Mine, who so ably aided in designing and actually constructed the fire fighting units. Credit is also due State and Federal mine inspectors who collaborated in the development and perfection of the equipment.

This article is based on a paper presented before the Coal Mining Institute of America, December 13 and 14, 1951.

## Be a Successful Boss

By HARRY NORTHOVER

MANY of us are bosses at one level or another. What's more, those of us who aren't bosses already look forward to being included in this category. Does being a good boss mean to be easy or self-effacing? Not at all. It implies instead, calmness and fairness, tempered by an interest in the subordinate as an individual.

The fellow who waits for something to turn up, may find his toes do first. Someone has to think beyond the clock; to dream beyond a shift; to be responsible for the payroll; to improve the product and sell the service. The only way to be more valuable to an employer is to produce more—either physically or mentally. The only way to have more is to give more. He who withholds willing work, who

quits as quickly as he can, and who closes his mind "after hours" has placed a penalty on his personal progress, on his future prospects, and on his country's production and prosperity.

### Follow the Rules

A good boss doesn't make changes affecting subordinates without explaining why.

If he must criticize, he does it privately.

He doesn't spy. A sense of privacy is necessary for self esteem.

He isn't a buck passer. Employees respect the boss who stands up for them and does not try to slough off responsibility when things go wrong.

He accepts suggestions. A one-man organization is a weak organization. No one can make all the decisions or watch all the details.

He learns to let others do what he can't do and doesn't expect them to do it precisely his way. Foremen and department managers make mistakes but so do general managers and presidents. For his own sake as well as for the sake of the work and for the sake of the future, he must give other people responsibilities and trust them to follow through. It enhances an employee's pride to feel important to the company.

He doesn't argue. Engaging in a heated debate with a subordinate creates future resentments. The boss will probably win his point but lose in the long run.

How many of these points do you practice?

# Blast Hole Drilling at the Erie Preliminary Taconite Plant

TACONITE was the name given by early geologists to the iron formation of the Mesabi Range. However, taconite is now defined as ferruginous chert or ferruginous slate in the form of compact, siliceous rock, in which the iron oxide is so finely disseminated that substantially all of the iron-bearing particles of merchantable grade are smaller than 20 mesh. It may be further defined as iron-bearing rock not merchantable as iron ore in its natural state and which cannot be made merchantable by simple methods of beneficiation.

Of the four main horizons in the Biwabik formation, the magnetic portions of the lower and upper cherty are the ones under consideration for current taconite developments as magnetic separation is the simplest and cheapest form of beneficiation. The magnetite particles in these horizons tend to be liberated at a grind of about -100 mesh.

## Mined Taconite in 1922

The first commercial mining of magnetic taconite for beneficiation on a production sale was done by the D. C. Jackling enterprise at Babbitt, Minn., some 20 miles east of the Erie Preliminary Taconite Plant. The Babbitt plant produced about 156,000 tons of sintered concentrate between 1922 and 1924. Along with being 25 years ahead of time, the Babbitt experiment failed because the profit was all consumed by the high costs of mining. At that time, churn drill bits varied from six in. to two ft per sharpening.

Even now, the success or failure of operating a large taconite mine depends largely upon efficient drilling and blasting. Not only is it a costly phase of the operation, but the efficiency of the following phases depend upon an adequate supply of well-fragmented material.

Along with providing a supply of material to the Preliminary Taconite Plant, the present pit is providing an opportunity for continual experimentation and testing of drilling and blasting methods which can be applied to the large scale operations in the future.

Starting in July, 1949, a concentrated effort was made to apply jet-piercing methods to producing primary blast holes in taconite. Up to the end of August, 1951, a total of

## Success in Operating a Taconite Mine Depends Largely on Efficient Drilling and Blasting Practices

By R. W. BELL

Assistant Mine Superintendent  
Pickands Mather & Co.

25,000 linear feet of hole were pierced while supplying a concentrator designed to handle 1800 long tons of crude taconite per day. This was done with the JPM-1 machine, the first commercial jet piercing machine made, and to date, the only one in production.

## Use Thermal Energy

In contrast to the mechanical energy used by the conventional methods in producing blast holes, the jet process uses thermal energy in the form of high temperature and high velocity flame jets produced in a rocket-type burner by the combustion of gaseous oxygen with either kerosene or No. 2 fuel oil. With the normal flow of 10,000 cu ft of oxygen and 41 gal of fuel

per hour, the combustion chamber pressure is about 100 psi, and produces a temperature of about 4300° F with a jet flame velocity up to 6000 fps. Dark shaped supersonic shock waves can often be seen in the jet flame as it emerges from the burner. The scientist can determine the velocity of the flame by measuring the angles of these so called "Mach" waves.

In the earlier days, the term "Fusion Piercing"\* was applied to this technique of producing blast holes. At that time, the thought was to introduce a flux along with the fuel and to actually smelt the hole into the rock. Additional experience has shown that because of less heat required, it is more economical to spall as much,



When the blowpipe is lighted piercing is ready to begin

\* Engineering and Mining Journal, October and November, 1946.





The hole sizer and burner hold the secret of successful jet piercing

and to melt as little of the rock as possible. It is estimated that at Erie 90 percent of the material is spalled and 10 percent is actually melted and blown out of the hole as a slag.

Impinging the flame jets on rock causes a thin layer to expand and break away with considerable force from the cooler underlying portion as a result of the thermally induced stresses. This spalling action is greatly accelerated in chert and quartzite by the increase in volume, resulting from the conversion of alpha to beta quartz at about 1066° F.

### Much Water Needed

Another important material required in this process is water, approximately 1000 gph is required to:

- (1) Keep the combustion chamber of the copper burner from being consumed by its own heat.
- (2) Quench and embrittle the portion of material actually melted by the flame.
- (3) Form steam. Most of the water is flashed to steam as it leaves the burner, and, along with the combustion gases, provide the means for continuously ejecting the spalled and fused material from the hole.

The three process materials—water, fuel and oxygen—are brought together in an assembly known as the blowpipe. This assembly is composed of a swing joint, kelly, and burner group. The swing joint makes it possible to introduce the three process materials into the kelly which can be rotated at either six or 18 rpm to produce a straight and uniform hole.

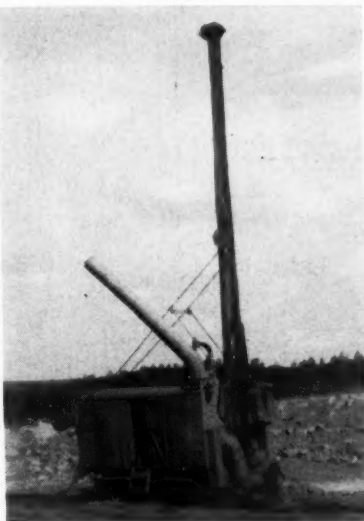
The kelly is a long, fluted, seamless steel tube 4½ in. in diameter. The depth of hole that can be pierced depends upon its length. Present depth is limited to 31 ft. Oxygen and fuel are carried to the burner through separate tubes inside the 2½-in. bore, and water is carried to the burner in the space remaining in the bore of the kelly. A new machine will be able to pierce a 47-ft hole. This appears to be the practical limit for hole depth in the near future.

Liquid fuel is atomized by the kinetic impact of the gaseous oxygen as the two converge in the combustion chamber of the burner, screwed on the bottom end of the kelly. Burned gases are exhausted through the divergent nozzles to form the flame jets. Water passes down between the burner and hole sizer into a labyrinth cooling system around the combustion chamber and nozzles of the burner and is then discharged across the front face of the sizer. The hole sizer is a heavy steel shell with six ribs welded longitudinally to the outside surface and extending about ½ in. beyond the end of the shell. The diameter of this sizer determines the minimum diameter of the hole. It also serves as a water jacket and protects the burner from abrasion in the hole. The water discharged out of the burner ports keeps the hole sizer from being scorified by the heat of the jet flames.

### Burner Is Key to Success

The burner, constructed from special oxygen-free bar copper, consists of an atomizer and an orifice-section silver-soldered together. This burner is the key to an efficient jet piercing operation. Its performance depends upon the number, size, shape and angularity of the flame jets. The life of the burner itself depends upon the proper arrangement of the labyrinth cooling system along with a sufficient flow of water at 80 psi for cooling.

Primary functions and purposes of the rest of the jet-piercing machine are to provide a mechanism for suspending, rotating, controlling blowpipe advance, provide means for metering and controlling the flow of the process materials, and for exhausting the steam and gases away from the collar of the hole. The machine was



The JPM-1 is the first commercial jet piercing machine made

built on a regular 42T drill chassis with traction crawlers having a forward and reverse speed of ¼ mph. Its total weight is 32 tons.

### Drilling Procedure

To pierce a hole, the operator sets the proper quantities of water, kerosene, and oxygen flowing through the blowpipe in the proper order by turning a lighting sequence switch which actuates solenoid valves in the respective lines. The helper then lights the burner by means of a long handled kerosene-soaked torch. Blowpipe advance is controlled by the operator who, by means of a rheostat, selects from an infinite range of speeds between 1 and 120 fph. Normally, the end of the burner is four to five in. from the bottom of the hole. If the operator should advance the blowpipe too rapidly, the hole sizer teeth come in contact with the bottom of the hole or the edge of a restriction. When this happens, some of the weight of the blowpipe is transmitted to the restriction, creating a buoyant effect and lessening the normal tension on the cable. The blowpipe is then retracted three-four in. to give the flame an opportunity to cut out the restriction. The operator is informed of the restriction by a grating sound transmitted up through the blowpipe, and by a resistance to penetration meter which continually measures blowpipe cable tension. A depth indicator and an ammeter on the rotary table also keeps the operator informed of developments in the hole. Sometimes rubble falls in on the blowpipe and, while there is no increase in cable tension, there is a tendency to bind. The operator will then switch from six rpm to 18 rpm to grind up the rubble. These three instruments enable the operator to judge at all times what is occurring in the hole, and control blowpipe advance accordingly.

Blowpipe advance speed depends upon the composition or character of the material, and varies directly with the spallability of the rock being pierced. The average advancing rate has varied from 8 to 35 fph. Reasons for these variations are:

- (1) The taconite is not uniform in character, but consists of alternating bands rich in silica or rich in iron, and varies from a very hard to a somewhat softer and partially decomposed material.
- (2) Natural bedding and jointing plane cracks.
- (3) Cracks due to back break resulting from blasting.

All of these rock discontinuities lower the piercing rate as spalling does not readily take place on sharp corners, in softer decomposed material, or in the thicker seams rich in iron. These discontinuities all have a tendency to melt rather than spall.

## Casing Needed Occasionally

Occasionally, in starting to pierce a hole, it is necessary to go through several feet of broken material. Under these conditions, a short casing is required at the collar of the hole, otherwise a large cavity is formed, and the material being ejected loses velocity and has a tendency to boil about this enlarged cavity. Placing the casing usually requires about 10 minutes. Whenever possible, an attempt is made to reduce the necessity for casing by scraping the proposed drilling site. When a hole is completed, the machine is moved over to the next hole, and a marker placed in the completed hole as a safety measure. All blast holes are staked out by the engineers and marked with the proper depth to be drilled. Each hole is numbered and plotted on a blast hole map for permanent records.

Average diameter of a jet pierced hole that has been produced with a 6½-in. sizer is 9.3 in. One big advantage of these holes is that they can be custom-made. That is, a small pilot hole can be enlarged at any point to about 11.5 in. by simply making a double pass with the present style burners at the same rate of speed used for piercing the pilot hole. In hard, spallable rock, hole diameter varies with the piercing speed; the slower the piercing rate, the larger the average diameter. However, in areas with a tendency to melt rather than spall, the outer reaches of the

hole become lined with slag and, with present style burners, ratio of piercing speed to average diameter does not hold true.

## Holes Are Rough

Walls of the jet pierced hole tend to be corrugated rather than smooth. These corrugations usually cause the diameter of the hole to vary from a minimum diameter equal to that of the hole sizer to a maximum of about 14 in. However, diameters as large as 20 in. have been produced. In the first attempts to get a picture of how the shape and average volume of these holes varied, a series of volume-depth measurements were made by back-filling some of the test holes with measured quantities of washed pea gravel, measuring the height of rise in the hole for each measured quantity of gravel. Recently a mechanical inside caliper device has been used to give an accurate measurement of the size and shape of the hole. This information helps to determine how the blasting agents should be placed and to compare the performance of the various burner designs.

A semi-automatic device for piercing control can be used along with the manual control and eliminates the need for constant vigilance. The machine can be set at the best piercing speed and will advance until a restriction is encountered. It will then automatically retract, dwell for a predetermined length of time, then advance in the usual fashion. It is up

to the operator to keep the blowpipe advancing as rapidly as possible without too many retractions.

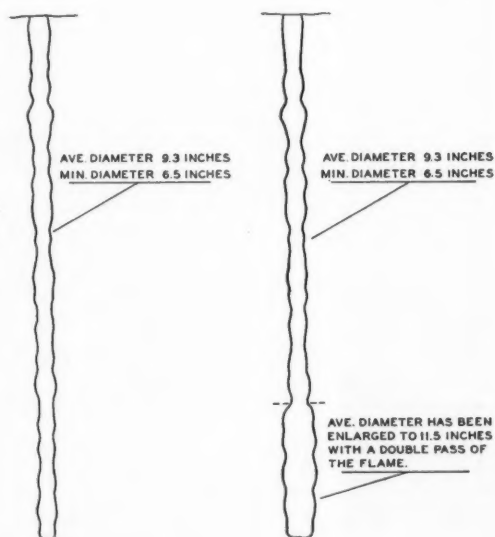
## Water Supply Is Problem

There are several additional operating problems connected with jet-piercing. The most difficult perhaps, is the matter of maintaining the water supply throughout the rugged Minnesota winter where the temperature falls to 40° F below zero.

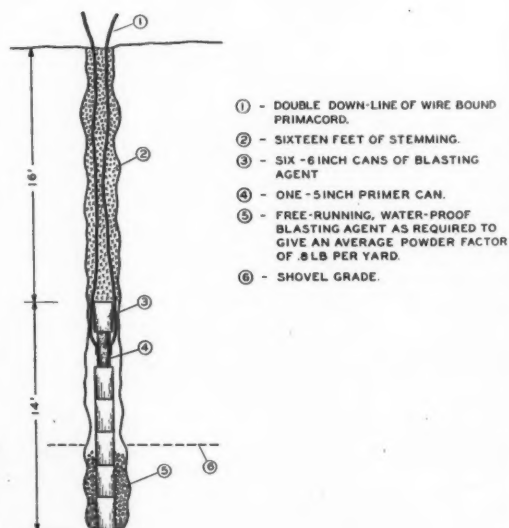
Water is brought from the mill reservoir to the pit area in a pipe line buried below the frost line. From the end of the buried line, insulated pipe carries the water to the drilling site. Connection to a 400-gal storage tank in the machine is made with a 150-ft length of rubber hose. At the start of the shift, as soon as the water line is connected, about five gal of water is heated before being passed into the blowpipe. Once flow is established, there is no problem of freezeups. During the winter, water is never turned off except for hole sizer changes, normally done at the end of the shift. In the present operation, where drilling is conducted on a single shift, the exposed water line is drained at the end of each shift as is the water tank, pump, and other lines within the machine; the blowpipe is purged with compressed air. On three-shift operation, many of these precautions would be eliminated.

Oxygen is transported to the Erie Plant Site in a special liquid tank truck which converts it into a gas,

SKETCH SHOWING A NORMAL JET PIERCED HOLE ALONG SIDE OF ONE "CUSTOM MADE" WITH THE BOTTOM SIX FEET ENLARGED



SKETCH SHOWING THE LOADING OF A TYPICAL 30 FOOT JET PIERCED BLAST HOLE



and pumps it at 2200 psi into a Cascade storage unit located about 1000 ft from the pit area. From the Cascade unit oxygen pressure is reduced to 500 psi and piped through a one-in. line to the drilling area. Here it is reduced to 250 psi and connected to the machine through a one-in. hose line. There have been no difficulties in supplying oxygen by this method. In larger operations, the pipe and hose lines will probably be increased, in order to deliver the same quantity of gas under a lower pressure.

Fuel is supplied to the 500-gal storage tank every other shift by a tank truck or by pumping from a storage tank. To facilitate moving, the fuel line is connected to the machine during the time of refueling.

Three-phase ac power at 440 v is supplied to the machine through a trailing cable according to standard open pit practice.

#### JET PIERCING DATA

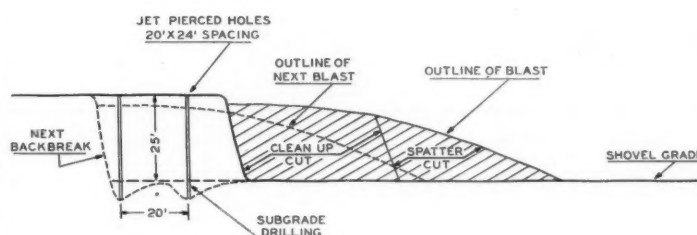
Oxygen required	10,000 Cu ft/hr
Fuel	41 gph
Water	1,000 gph
Power	25 kw
Average piercing rate	15.2 fph
Hole size, minimum diameter	6.5 in.
Hole size, usable diameter	9.3 in.
Operating efficiency	66%

As mentioned before, piercing in solid rock without any discontinuities gives the highest piercing efficiency. To date, the maximum footage pierced in one eight-hour operating shift has been 166 ft. This was pierced at the average rate of 26 ft per hr piercing time. A churn drill in this same area would average about 12 ft per shift.

Following is a summary of the problems involved when using the jet piercing process:

- (1) While the maximum depth of hole with the JPM-1 machine is 31 ft, a new machine under production will have a capacity for piercing a 47-ft hole, as a 66-ft mast will be required to support this length of blowpipe, it appears this will be about the maximum depth for jet-pierced holes for the near future. However, as the working bench in a large taconite operation will probably be limited to about 40 ft, this 47-ft hole should meet the majority of the drilling requirements.
- (2) Dependable water supply in freezing weather. This constitutes a major problem in northern Minnesota where the temperature often drops to 40° below zero. A circulating or well-insulated line will be required to carry the water from the crest outlets to the drill site. In a large scale operation, the water will probably never be

SKETCH SHOWING CROSS-SECTION OF BENCH WHEN DRILLING & BLASTING TWO ROWS OF HOLES



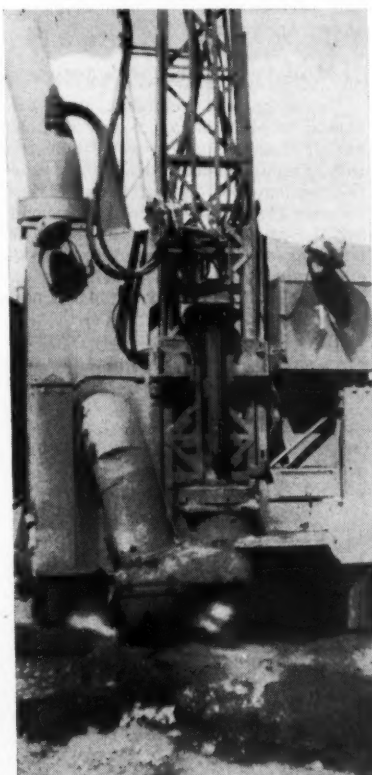
Average piercing rate is eight percent higher in second row of holes because of less back break to interfere with process

shut off, except for about 10 minutes each shift to make hole size changes.

- (3) Because of the chemical changes resulting from the high temperatures applied to the mag-

netic taconite, the material ejected from the holes does not give a true sample. Continuous sampling of the benches is important. It will be necessary to use another type of drill to provide bench samples. These sample holes can also be used as blast holes.

- (4) In areas where a large percentage of the rock tends to melt, the average diameter of the hole is lessened to some extent by slag that tends to fill the corrugations of the hole. A modified burner and hole-size design will probably improve this condition.
- (5) Where the jointing and bedding plane cracks opened up in the top 12 to 15 ft of ledge and formed large crevices, the cuttings were forced into them and were held there by the gas pressures until after the blowpipe was withdrawn. The cuttings would then slump and fill up part of the hole. Usually the trouble making vertical crevice could be detected from the surface. A hole pierced 3 or 4 ft normal to this crevice would usually produce a full depth hole. In a large operation another type of drill would probably be used to combat this condition.
- (6) While the jet piercing has proven itself to be sound in principle, it is still in the infancy stage. Indications are that there will be continual improvements made to better performance and lower maintenance cost.



With hole down 25 ft, steam and gases are exhausted from working area in front of machine



TABLE I—CHURN DRILL DATA FOR DRILLING MAGNETIC TACONITE

	Type of Drill		
	29T Diesel	42T Electric	JPM-1 Jet Piercing
Size of bits or size—in.	9	9	6.5
Total number of ft drilled.	2296	12,623	25,000
Total number of holes.	123	410	.....
Average depth of holes—ft.	18.7	30.8	30
Ft drilled per hour actual drilling time—average.	1.94	2.29	15.2
Ft drilled per hour total operating time.	1.11	1.52	.....
Total ft drilled with carbon bits.	1780	3,106	.....
Average footage per carbon bit.	5.11	4.08	.....
Total ft drilled with alloy bit.	506	9,517	.....
Average footage per alloy bit.	5.88	5.11	.....
Percent operating time.	57	66	.....

### Advantages Proved

During the two-year period that the JPM-1 jet piercing machine has been operated at the Erie Preliminary Taconite Pit, it has proven or brought to light several advantages resulting from using this process.

- (1) In the very hard, abrasive, consolidated material where the conventional type of drills operate at their lowest efficiency, the jet process operated at its best.
- (2) Present data indicate that a jet piercing machine will produce as much tonnage as seven electric churn drills, and the need for a large bit sharpening shop is also eliminated.
- (3) The feasibility of chambering, or of selective hole enlargement has been proven.
- (4) The semi-automatic piercing control helps to eliminate the human factor and tends to make for higher machine efficiency.
- (5) Conclusive tests have shown that oxygen of 90 percent purity will work as well as the high purity oxygen now being used. At present 50 percent of the total cost of jet piercing is oxygen, any reduction in this will have a marked effect on the

total cost. As each shift operated will require about 2.5 tons of oxygen, it is evident that the capital expenditure for a bulk oxygen plant will be warranted on a large operation requiring six or seven jet machines operating three shifts per day.

### Compare With Churn Drill

Reference, or comparison has been made from time to time to churn drilling. Following is some of the information gained when using this method of drilling in magnetic taconite. The initial blast hole drilling at the Erie was done in 1948 using both 29T diesel and 42T electric churn drills with nine-in. bits. Data on the performance of these drills are shown in Table I.

### Modify Blasting Practice

Under normal conditions it is preferred to blast a double row of holes rather than a single row of holes, as this practice makes available twice the tonnage per foot of face. It also reduces the work required in providing the process fluids to the drill. In addition, the average piercing rate is eight percent higher in the second row than in the first. This is due to presence of less backbreak.

The average 30-ft hole with a 20 by 24-ft spacing is loaded with six, 6-in. diameter cans of blasting agent. The cans are lowered into the hole placing a five-in. primer, with a double down-line of wirebound primacord attached next to the top can in the hole. At this point, the desired quantity of a recently developed free running waterproof blasting agent is poured into the hole. This utilizes the space between the can and the wall of the hole. At present the holes are loaded using an average powder factor of 0.85 lb of blasting agent per cu-yd, or 0.35 lb per ton of material. Because of the proximity of the present pit to the concentrator, the height of the explosive column is limited to 14 ft. In a large operation, the column height would be increased or a deck charge of explosive would be placed about 10 ft from the top of the hole to improve fragmentation. The remaining 16 ft are stemmed with minus  $\frac{3}{8}$ -in. mill feed material. In wet holes, some benefit is obtained from the water as stemming in the bottom of the holes. Most of the holes are dry, but occasionally a hole will have as much as 20 ft of water.

Holes are detonated using either a millisecond blasting timer or millisecond primacord connectors. When using millisecond delays, very little difference has been noted in backbreak resulting from double row over single row blasting.

Consideration has been given to using LOX (liquid oxygen) as a blasting agent. The time element required in loading, stemming, blasting and the safety hazards involved make it apparent that this form of blasting agent would not be suitable nor desirable for large scale operations.

Any secondary breaking required in order to feed the material to a 42-in. gyratory crusher is done by a 6½-ton skull cracker on a 1¼-cu yd shovel fitted with a 55-ft boom.



Oxygen storage unit is located about 1000 ft from pit area



Shop and office of the Dakota Collieries Co.

LIGNITE mining is but a small segment of the coal industry in the United States, a segment about which not much is generally known. There are some very great misconceptions about its uses and production which should be cleared up.

Lignite coal is mined in Texas, California, Wyoming, Montana and North and South Dakota. However, the great bulk of our lignite reserves lies in Wyoming, Montana and North Dakota of which North Dakota has by far the greatest percentage. Of the total lignite production in the country, 97 percent comes from North Dakota and amounts to, at the present time, approximately 3,200,000 tons per year. This is a very small percentage of the total amount of coal mined in the United States, but represents a very sizable business factor to a sparsely populated state such as North Dakota.

It is roughly estimated that the lignite reserves within North Dakota approximate 600 billion tons. However, with present mining methods, only a very small part of this reserve is accessible for commercial mining. Of this only the deposits that lie near rail transportation can be mined profitably at the present time. It must also be remembered that these reserves include all deposits down to a depth of approximately 1000 ft. Over most of the state water conditions are such that it is almost impossible to mine deeper than 100 ft with present mining machines and tools.

Below the ground water level it seems that lignite seams act as aquifers rendering the coal almost unminable. Therefore, while potential reserves are there, the actual reserves amenable to mining as we now know it, are considerably less than the 600 billion tons claimed. Most of the best reserves, ones which can be mined eco-

## Lignite Mining

By W. A. PORTER

Vice-President  
Dakota Collieries Co.

### Modern Methods and Intensive Research Point the Way Toward Greater Utilization of Vast Reserves

nominically, are either owned outright by mining companies or are under option.

Today lignite coal is used principally for home heating and in steam generating plants. It is a non-coking coal but has been and is at the present time being briquetted successfully. There is no practical method of drying lignite now, but tests on lignite drying at the U. S. Bureau of Mines Laboratory at Grand Forks, N. D., have been encouraging.

Of the present 3,000,000-ton annual output, probably more than 2,000,000 tons are consumed by steam generating plants in North Dakota and in the adjoining states of Minnesota and South Dakota. This represents quite a sizable increase over the consumption of even 10 years ago. Use of lignite for home heating has increased in the past few years also, but the relative proportion of lignite being used for home heating as compared to use in steam generating plants has decreased.

#### Seek Other Uses

The Bureau of Mines maintains an extensive laboratory at Grand Forks which is constantly testing lignite for uses in other fields. It is being tested

quite extensively for use in chemicals, gas and tar products, pigments, acids and other uses. No doubt, at some future date, it will be used economically in other businesses.

Lignite generally is an extremely hard coal. It comes out, as mined, more as a slab than as chunks such as bituminous coal and anthracite. Although it is widely thought of as a very soft coal, the crushers that work



This dragline doubles as a shovel to load coal during the winter season

efficiently on bituminous coal are not equal to the task of crushing lignite for commercial use. This is probably because of lignite's woody nature.

The high percentage of moisture in the coal causes it to slack quite rapidly when exposed to the sun and air and for that reason it cannot be stockpiled as higher grade eastern coals are. However, if lignite is packed quite hard by rolling, it maintains its heat value very well. The approximate analysis of a good grade lignite is:

Moisture .....	34 percent
Volatile .....	27 percent
Carbon .....	33 percent
Ash .....	6 percent
Heat Value .....	7200 Btu

From the analysis it can be seen that a great deal of water is shipped to the consumer whereas if a successful drying method could be employed it would save the ultimate consumers a considerable amount of money in freight.

In the state of North Dakota there are seven large producing mines which account for 90 percent of the total production and 98 percent of the rail shipments in the state. All but one of these mines are strip operations. There are some 200 small truck mines in the state but these operate mainly as a source of revenue or as a convenience to farmers in the section where the small mine is located.

## Early Stripping Equipment

Dakota Collieries Co. has been producing lignite coal since early in 1920.

The history of the company's Indian Head mine, located near Zap, N. D., some 80 miles northwest of Bismarck, is representative of most of the larger mines in the state. It started as an underground mine using very primitive methods and changed over gradually to a stripping operation.

Stripping operations, as first started, now seem very old fashioned but in the 20's and 30's the equipment used at the mine seemed very modern, indeed. Stripping was begun with a track-mounted Bucyrus-Erie Class 225 B steam shovel with a seven-cu yd bucket on a 90-ft boom. This was augmented by a Bucyrus-Erie Class 24 steam dragline which moved on rollers.

The steam shovel was operated by an operator and a crane, a fireman and an oiler. It was necessary to have a man on the machine to haul the coal for firing the boilers up in buckets, and from six to seven ground men inasmuch as caterpillars, bulldozers and patrols were very rare. In other words, to run a machine of this size it took approximately 12 to 14 men on each shift—modern electric machines require from one to three.

Coal loading was done by a Bucyrus-Erie 50 B steam shovel which carried a 2½-cu. yd. bucket. This also required

an operator, fireman, oiler and two ground men. Coal was loaded into dinkey trains hauled by Vulcan and Davenport steam locomotives approximately two miles to a wooden tippie. The danger of fire was very great. The old tippie burned down in the early 30's and was replaced by another tippie of timber and galvanized steel construction. All of these outmoded stripping and mining machines have since been replaced by modern diesel and electric equipment.

Stripping equipment now being used at Indian Head is a Marion, Model 7200, electric walking dragline with a 135-ft boom using a seven-cu yd Esco bucket, and a P & H, Model 1055, diesel dragline, 100-ft boom and a four-cu yd Esco bucket. Overburden varies from 20 to 65 ft with an average of 50 ft. Cuts 80 or 90 ft wide are made by the Marion dragline with assistance, where needed, from the P & H dragline operating on the spoil bank. It is sometimes advantageous to take the overburden in two benches. This allows the spoil to be cast further and eliminates rehandling.

## Design Coal Cutter

Drilling of overburden is unnecessary except where there are ledges of rock. In these cases a horizontal Hardsocg drill is used to drill holes. When smaller boulders occur an air drill is used to break up the rocks too

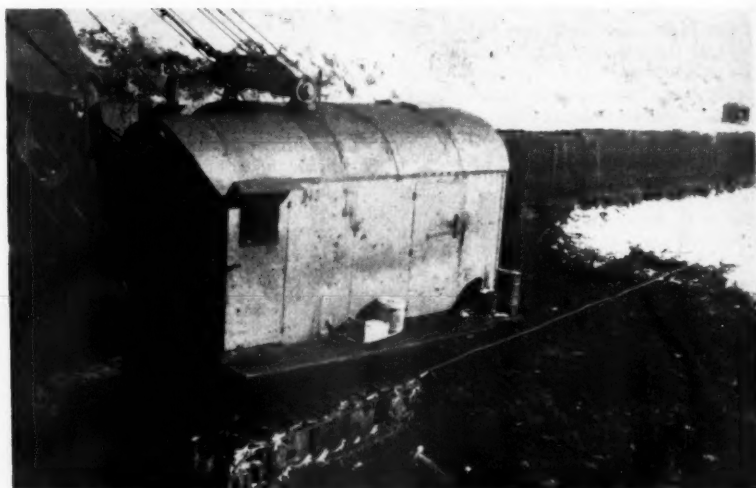
highway for the trucks, but also exposes a clean face for the loading shovel to work against. It has been our experience that a great deal of wear and tear on the loading shovel is eliminated when it works against a smooth face rather than having the shovel trying to make a smooth face by itself. The cutting machine is economical to run and performs its duty in one easy operation.

The coal seam ranges from approximately 11 to 14 ft in thickness and in this particular mine averages 12 ft. Some of the mines in the state are mining lignite seams as low as five and six ft while others are up to 18 and 20 ft thick.

Underneath the coal seam lies a very hard fire clay which makes a solid footing for the coal loader. There isn't much of a water problem and the occasional ground water that collects in the pit is disposed of by either a piston type pump or a three-in. centrifugal pump.

## Have to Shoot Coal

Coal has to be shot and this is done immediately ahead of the loading shovel. Two-in. holes are drilled by a Hardsocg electric vertical coal drill. Different types of dynamite are used depending on the hardness of the coal and the particular production schedule. Loading is done by a Marion Model 490 electric shovel, with a 3½-



A straight face on the coal, made with a vertical cutting machine, facilitates loading

large to move with a dragline bucket. After the coal is exposed it is cleaned as much as possible by bulldozers and a caterpillar auto patrol.

A novel and economical method of cutting is employed to leave an even ledge upon which the trucks can run for coal loading purposes. In the mine shop, mechanics designed a vertical coal cutter which employs an eight-ft cutter bar powered by a 100-hp induction motor. This not only gives a safe

cu yd Esco coal dipper, into a fleet of seven Euclid 20-ton coal trucks. It is hauled approximately 3½ miles to the coal preparation plant for rail shipment. A material known as "scorio" is used in road construction. It is found in great abundance in this area of North Dakota. Scorio is a very hard red material which is ordinary clay that has been baked by the subterranean burning of lignite in the past. It has the consistency of broken





The coal has to be shot before it is loaded out

brick and makes an excellent road material. As long as this is easily available it makes an economical road surfacing material. Loaded trucks haul down grade to the railroad and except in the spring, with its alternate thawing and freezing, haulage conditions are very good.

Temperature in this area has a 140-deg range, from the 40 or 45 deg F below zero in January and February to 100 deg F above zero sometimes experienced in the middle of the summer.

Operating conditions in winter are particularly difficult because of heavy snow and extreme cold weather but since lignite cannot be stockpiled successfully, it must be produced as orders are received. It is necessary therefore to operate every day possible, even during the extremely cold weather. Indian Head mine has a good record on this score and has lost only an average of two or three days working time a winter because of weather. It is necessary, also, to keep all motorized equipment such as trucks, bulldozers, patrols, etc., indoors in the wintertime otherwise it would be almost impossible to start them for the morning shift.

Another important mine installation is the shop. It is adequate to make almost any repairs. This provision is necessary because the mine is far from suppliers and must be largely self-reliant.

### Built New Tipple

A new all steel and concrete tippie has been erected for the Dakota Collieries Co. It is a three track tippie and incorporates all the latest screening, crushing and loading methods.

After much deliberation a three track tippie was decided on. The new type construction in tipples allows a very flexible operation. In erecting this plant no valid reason could be seen for greatly increasing its cost by putting in four or five tracks, when the extra facilities would be used only a few days each year.

Stoker coal trade has increased considerably while the larger sizes of prepared coal are harder and harder to sell.

### Load Into Boxcars

Another characteristic of the lignite industry is that it is necessary to be able to load any size coal into boxcars inasmuch as a good share of the business in the northwest goes to small town elevators and coal dealers without facilities to unload open-top cars. This necessitates the use of either Barber-Greene or Ottumwa Boxcar Loaders on all tracks.

The bottom dump trucks run over a 100-ton capacity steel and concrete hopper. The coal drops to a 30 in. by 72 in. primary crusher which during the normal fall and winter months will crush the coal to a top size of six in. This goes to a 66-in. reciprocating feeder which in turn feeds the coal on to the flight conveyor into the main plant. The flight conveyor, on 36-in. centers, takes a six-in. top size coal at 100 fpm into the main plant at the rate of 300 tpm.

It must be remembered, because of the characteristics of lignite, fall and winter operations are distinctly different from the summertime operation as the coal is mined and shipped as it is used. During the fall and winter months sizes of prepared coal for domestic heating are in demand whereas during the spring and summer months, when the only customers are power plants, all of the coal must be crushed to a 1½-in. or two-in. top size.

As the coal comes into the main plant it is screened to take out the 1½-in. coal to be used for steam plant screenings. The 3 by 1½-in. size is screened out and crushed for stoker coal which is sized at 1½ by ½ in. The next size is the furnace coal, 6 by 3 in. It is the final product after the smaller sizes have been removed. Other products are a 3 by 2-in. stove coal, a 2 by 1½-in. nut coal in addition to the 1½ by ½-in. stoker coal and the 1½ in. by 0 screenings.

When crushing coal for the steam generating plants all of the top sizes including the 6 by 3 in. is again put through another crusher, a 36 by 48-in. Gearmatic. This gives a 3 in. by 0 product. This is again put through a 24 by 48-in. Gearmatic crusher which produces a 1½ in. by 0 size. Lignite is indeed a hard coal to crush and three stages of crushing are needed to get the coal from top size down to 1½ in.

On Track No. 1, 6 by 3-in. furnace coal is loaded either into boxcars by a boxcar loader or into open-top cars by boom loading. This is by far the best seller in the domestic home heating trade in North Dakota.

On Track No. 2 it is possible to load 3 by 2-in. coal into boxcars or into open top cars. The 2 by 1½-in. nut coal, stoker coal, or screenings are all handled on this track. All sizes, 3 by 2-in. or less, are Dustlix Oil treated.

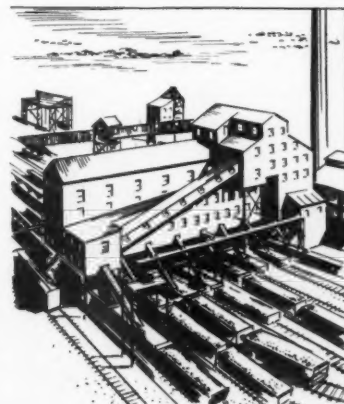
On Track No. 3 it is possible to load only into open-top cars. The 1½-in. by 0 screenings or any size screenings are loaded here.

### Tipple-Heating Is Important

The new tippie is heated by an E. K. Campbell hot air furnace. The heating system is entirely automatic and the structure is entirely enclosed above the car level. This is a must because of the extremely cold weather in this area.

The tippie itself is entirely automatic with a central switchboard. The lower yard will accommodate about 100 loaded cars and the tail track approximately 100 empty cars. Railroad service is furnished by the Northern Pacific Railway and during the heavy coal season daily service is given.

In the last 30 years lignite coal mining has made great strides forward along with the rest of the coal industry, and it is felt that, although it may not be for the next few years, lignite will come into its own and will be used for many purposes other than for heating.



# THE JEFFREY MANUFACTURING COMPANY

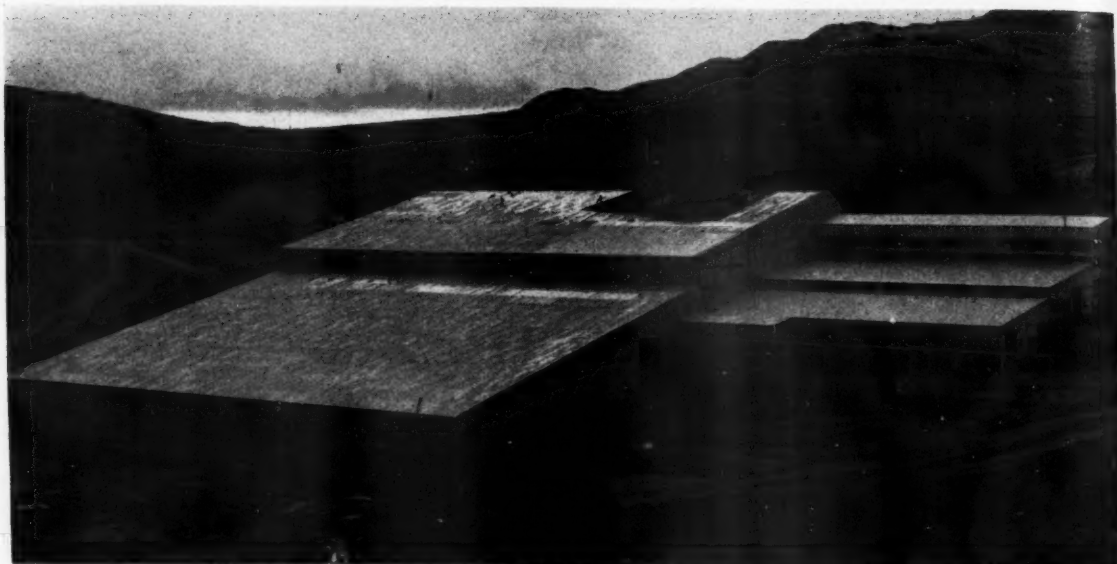
958 North Fourth Street, Columbus 16, Ohio

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Unit at New Carlton Mill, Golden Cycle Corp., has been operating over a year

# New FluoSolids Experience

**Important Advances Help Relieve Sulphur Shortage  
and Widen Field of Application**

**By G. G. COPELAND**

Formerly Sales Engineer  
The Dorr Co.

THE FluoSolids process as developed for pyrometallurgical applications involving the roasting, calcination or heat treatment of ores, etc., has been in commercial use in the non-catalytic field since 1945. The current sulphur shortage has caused new emphasis to be placed upon the extraction of sulphur from the sulphides of the metals by roasting, and FluoSolids is playing an important part in relieving the critical situation.

FluoSolids may be described as a radically new metallurgical process by which reactions between gases and solids can be more readily accomplished at elevated temperatures and at accelerated rates previously not possible. The process is finding application in many fields, but a typical operation is the roasting of sulphide ores or concentrates to produce strong  $\text{SO}_2$  gas and, at the same time, a calcine containing less than one percent sulphide sulphur and less than two percent total sulphur. The technique requires that the solids, to be reacted, be fluidized or partially suspended by an upward moving gas stream. When so fluidized, they are in a state of violent agitation and evenly distributed throughout the fluid bed. Fluidized

solids in this state obey many of the laws of hydraulics and are efficient heat transfer systems. Close regulation of feed gas rate and temperature is possible.

## Sulphur Shortage Critical

Operators are aware of the critical shortage of elemental sulphur. Producers have been shipping record tonnages of sulphur each year since 1939. Domestic elemental sulphur production for 1951 reached about 6,000,000 long tons, compared to a total production in 1939 of approximately 2,250,000 long tons.

Sulphur has played an important part in the making of history. Present day industrial development would have been impossible without sulphur which in its end-use form is usually converted to sulphur dioxide and sulphuric acid. Prior to 1900, sulphur was obtained from Sicily in the form of brimstone or from Spain in the form of pyrite. The Frasch process for extracting elemental sulphur from the huge Gulf of Mexico reserves of the U. S. A. was developed following the discovery of elemental sulphur in Louisiana about 1865.

Frasch process sulphur gradually replaced imported sulphur and pyrites in the domestic market. In 1950 brimstone consumption was over ten times greater than pyrite consumption. Exports of brimstone have increased to a point where total tonnage, to all countries outside of North America, exceeded 1,000,000 long tons in 1951.

## A New Approach

Brimstone or elemental sulphur can be converted to sulphur dioxide so readily that roasting of sulphides for the production of sulphur dioxide has almost become a lost art in this country, practiced only by those companies with access to cheap supplies of sulphides. Many companies abandoned their sulphide roasters during the past decade and practically all new industry using sulphur has been equipped solely for the use of elemental sulphur.

The vast brimstone reserves of this continent are rapidly being depleted even though new deposits have been found and much exploration continues. However, there is ample sulphur available in North America in the form of sulphides to augment the native sulphur supply and satisfy the needs of industry for a long period to come. Sooner or later greater use will have to be made of these sulphide reserves.

Utilization of sulphide sulphur will depend upon economics. Nature has never seen fit to locate mining areas near the sites most often picked for fertilizer plants, oil refineries or pulp mills, so an upward revision in the

value of sulphides will be natural. Mine operators will be called upon to install additional equipment for the recovery of by-product sulphides. The consumer will be forced to install adequate roasting facilities, or third parties ready to supply sulphides as well as the roasting equipment may enter the picture.

Many consumers heaved a sigh of relief when the old roasters were abandoned and the days of dusty, gas-laden atmosphere were gone. Reluctance to return to this form of roasting is natural; but the FluoSolids process is a new approach to a very old metallurgical technique. As a result FluoSolids roasters have found ready acceptance for the production of strong sulphur dioxide gas (14 to 15 per cent) from sulphides.

### FluoSolids and Sulphur

The fertilizer industry is the largest sulphur consuming industry in the U. S. A., and its expansion has had much to do with the present shortage.

Fertilizer production has increased almost threefold since 1939, indicating a growing recognition of the importance of chemical additives to the soil.

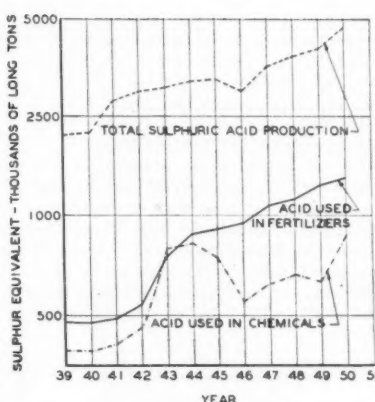
Sulphuric acid is used as a chemical in many industries varying from explosives to soap, from plastics to titanium dioxide, and from foodstuffs

to insecticides. Consumption in this field has increased over threefold since 1939.

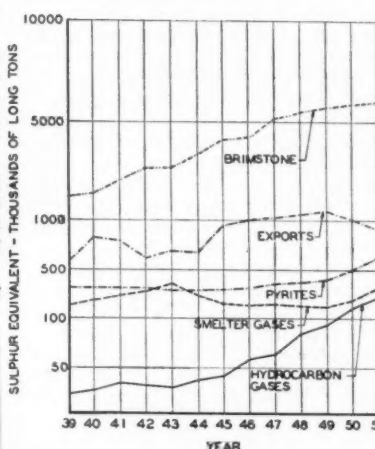
Sulphuric acid plants require that the incoming gas contains a high percentage of sulphur dioxide with a minimum of sulphur trioxide. Eight, 20 ft diameter FluoSolids units are currently in the process of manufacture for acid plant use. These will produce a 14 percent sulphur dioxide gas (by volume) from pyrite concentrates containing 45 to 50 percent sulphur.

Use of the FluoSolids Process for producing sulphur dioxide is not confined to high-grade sulphur-bearing ores. Pilot plant tests in a five-ft reactor have demonstrated the feasibility of producing high strength gas from copper and zinc sulphide concentrates. Other tests have shown that pyrrhotite can be used as readily as pyrite, and crushed crude sulphide ores are as easily handled as flotation concentrate. Ores containing as little as 20 percent sulphur have been roasted successfully with the production of strong sulphur dioxide gas. A 22-ft diameter unit is currently being installed in Canada and will produce sulphur dioxide gas for sulphuric acid from zinc concentrates containing about 30 percent sulphur.

FluoSolids reactors have no moving



End use pattern—major industries

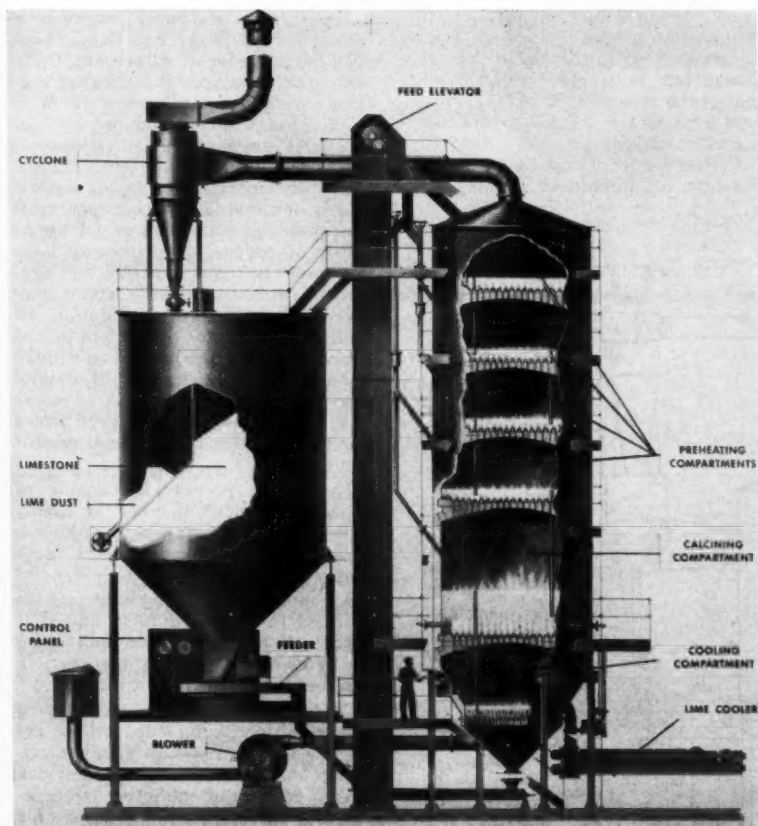


Sulphur production, U.S.A.

parts and operators cannot open parts on the system during operation. Gas strength can only be altered by a change in fluidizing gas volume or oxygen content, or by changing feed rate or sulphur content of the feed.

Metallurgical companies in the United States and Canada, operating smelters for the extraction of zinc and copper from sulphide concentrates, annually throw enough sulphur into the atmosphere in the form of weak sulphur dioxide to more than make up the deficiency of sulphuric acid. For the most part, these plants use conventional type roasters from which high strength gas could not be obtained without radical changes in design, and are generally geographically outside the economic marketing range of sulphuric acid. However, increases in the market value of sulphur will be reflected in the price of sulphuric acid and may soon bring some of these metallurgical plants into the sulphur picture as producers of acid.

The pulp and paper industry is the fourth largest sulphur-consuming industry in this country and the largest consumer in Canada. In 1951 it is



Reburning lime mud from water treatment plants is a new development

estimated that domestic pulp mills will consume close to 500,000 long tons of sulphur. Canadian mills, hoping to expand, but faced with drastic cuts in supply, will consume about 300,000 long tons or about 75 percent of all sulphur imported into Canada.

Gas strength to the absorption towers in sulphite mills must also be high in sulphur dioxide with a minimum of sulphur trioxide. Sulphite paper producers have been quick to realize the potential of the FluoSolids Systems in the utilization of sulphides for the production of this sulphur dioxide.

### New Developments

A significant improvement in the design of FluoSolids units has been the development of a constriction plate which allows free passage of the fluidizing gases and yet prevents solids sifting to the windbox even if gas flow is shut off entirely. This improvement took the form of the so-called "bubble cap" design, was first installed on the FluoSolids Reactor at the new Carlton Mill of the Golden Cycle Corp., and from all reports, has been highly successful. The unit there has been in operation since January, 1951. Bubble caps are inserted into the constriction plate at calculated intervals and are surrounded by refractory insulating material. The addition of these caps has insured that intermittent operation of FluoSolids Reactors will be facilitated even when very finely divided materials are to be fluidized.

The design of cyclone dust collectors is perhaps one of the most critical problems of the FluoSolids System. Special consideration must be

given to variations in operating conditions brought about by local handling problems. Dust collection from the exit gas of all FluoSolids Reactors in operation at this date has been adequate. Dust loadings in the cyclone exit gas of about five grains per cu ft of dry gas are standard for conventional FluoSolids Systems. These loadings are acceptable to the gas scrubbing systems in sulphuric acid and sulphite pulp plants.

### Temperature Controlled

Temperature control in standard sulphide roasting FluoSolids units has been satisfactorily achieved by injecting water into the fluid bed in automatically controlled amounts. Some sulphur consuming processes, notably chamber acid plants, cannot accept the water load borne by the roaster gas. The problem of temperature control can then be met by either recycling some cooled calcine from the system or by recycling some cooled exit gas from the system. Both of these methods have been used heretofore in conventional roasting processes, and they lend themselves readily to the FluoSolids application.

Waste heat boilers are being installed in conjunction with some of the FluoSolids units sold to sulphuric acid manufacturers. Heat recovery from the roasting of pyrites is economic from the larger roasters. In this country the use of waste heat boilers appears to be attractive to few producers but in Europe where fuel is scarce the recovery of heat is considered a necessary adjunct to the roasting of sulphides.

Preheating of fluidizing air for the roasting of sulphides is being con-

sidered for one large acid plant installation. This will be achieved by heat exchange with the hot exit gas from the system, and can be practiced to advantage where made desirable by the heat balance.

### Sulphatizing Roasts

Significant advances have been made in the FluoSolids Process for controlled sulphatizing of the base metals. Close control over reaction temperature has opened up a wide new field in the metallurgy of metals. Much has been written about the critical temperature ranges in which sulphides of the metals can be converted to the soluble sulphates. It is now possible to sulphatize or solubilize one base metal in the presence of, but to the exclusion of, another metal.

Temperature control on the order of 10° C is possible in FluoSolids Systems and, since the critical sulphatizing temperatures of the base metals have a much wider spread, necessary control is readily provided.

Operation of a pilot copper sulphatizing unit throughout 1951 showed excellent results. This plant is sulphate roasting copper sulphide concentrates produced in a pilot flotation plant. Soluble copper is leached out of the calcine and precipitated as metallic copper in an insoluble anode electrolytic circuit.

Extractions of copper, by recirculated electrolytic cell tail liquor, have been on the order of 97 percent. Cathode copper analyses show copper contents in excess of 99.8 percent. Wire bar copper will be produced by conventional single-stage fire refining of the cathodes.

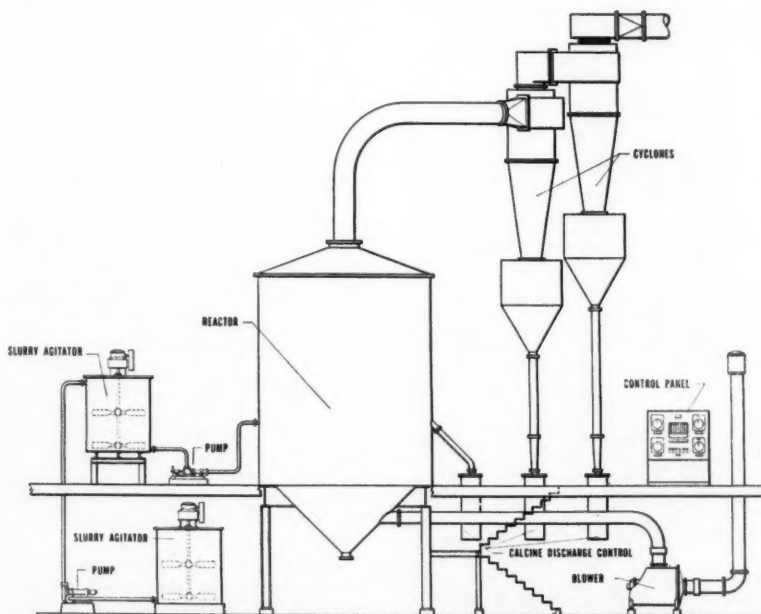
Copper concentration in the electrolyte is lowered 50 percent per cycle at a power consumption of 1.1 kw ac per lb of copper. Stripping of solution may be done entirely by electrolysis with no cement copper produced. Total power consumption, including stripping of electrolyte to 0.35 grams of copper per liter, is calculated to be less than 1.3 kw per lb of total copper recovered. The increased power cost is less than the cost of scrap iron and lime for conventional cement copper circuits.

The whole process is capable of operation without the use of highly skilled technicians and lends itself admirably to use in areas where labor supply is a problem.

A copper sulphatizing unit will be installed in Japan in 1952, and it is possible that two large plants using the process will go into operation in this country in the near future.

Concentrations of SO<sub>2</sub> gas from a copper sulphatizing operation are much lower than from a straight oxidizing roast of the same material. This is because of the lower temperature and greater amount of excess air

(Continued on page 54)

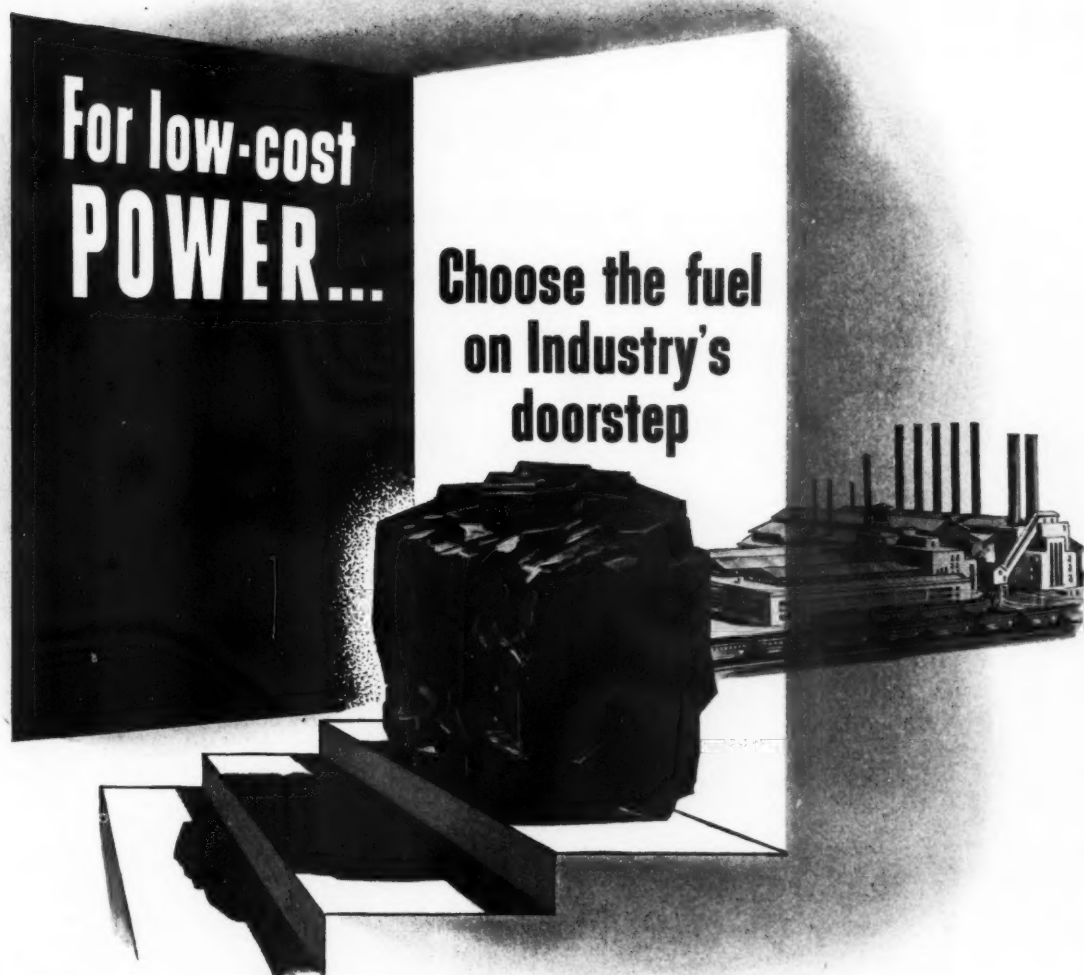


Typical FluoSolids installation using slurry method of feeding



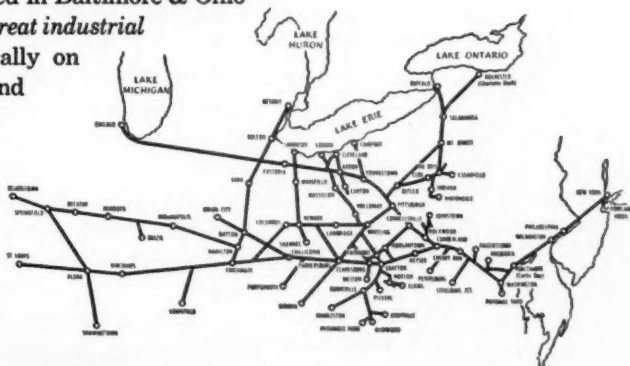
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Sludge recovery is an integral part of the modern coal cleaning plant

# Sludge Recovery From Coal Cleaning Plants

By J. J. MERLE  
W. R. CUTHBERT  
T. O. WASH, JR.  
V. D. HANSON

**Surface Preparation Committee Reports Typical Examples of Recovery Processes with Data on Tonnage Reclaimed and the Size Consist of Solids in the Waste Water Before and After Treatment**

TO MAKE a virtue of a necessity is good strategy; to make a profit out of it is good business. Coal preparation plants faced with two necessities are practicing both good strategy and good business. The answer to water shortage is recirculation, and a coal cleaning process which may require as much as 10,000 gpm can use this over and over again so that the actual additional water input amounts to a small percentage of the total. The next necessity is the prevention of stream pollution. Within recent years this trend has become more pronounced and, today in the Ohio River basin, there are plenty of "Do Not Enter" signs between the coal washery waste and the surface streams. The simple answer to this would seem to be a disposal pond where the waste water could clarify by the natural process of settling. However, this waste or slurry con-

tains large quantities of fine coal with a high Btu content. The modern technique is to recover a large portion of these solids and include the reclaimed

product in the merchantable coal. In some cases this recovery will be 200 or 300 tons per day which adds an appreciable number of dollars and cents to the sales of mine output.

The Surface Preparation Committee is gathering data on methods used for sludge recovery in various fields and seams of coal. As a part of this study four reports are presented here covering typical methods in the middle west and in the northern and southern Appalachian fields.

## Sludge Recovery in Strip Mining

By J. J. MERLE

### MINE A—East Central Illinois No. 7 Seam

THE preparation plant covered in this report has installed facilities to recover a plus 60-mesh coal that was formerly lost as sludge and also to improve the quality of fines produced for market. The plant has a rated capacity of 600 tph but the actual feed is about 900 tph. This, however,

includes an appreciable quantity of large rock which is scalped off before it enters the cleaning process. In the main preparation plant the raw coal is first crushed to minus six in. in a rotary breaker and is then treated in two 5-cell jigs, each with a rated capacity of 300 tph. Middlings from both jigs are crushed to minus 1½ in. and recleaned in one 5-cell jig. The washed product, after passing over classifying screens, dewatering

TABLE A—PERCENTAGE BY WEIGHT OF SOLIDS IN WASTE WATER

Size	Before Sludge Recovery	After Sludge Recovery	Fine Coal † Plant Refuse
Plus 4 mesh.....	1.7	0.7	...
4 x 8.....	5.1	2.3	1.1
8 x 10.....	3.1	1.3	1.2
10 x 16.....	14.5	4.7	9.0
16 x 18.....	3.8	1.7	4.9
18 x 20.....	3.3	1.7	5.1
20 x 30.....	3.4	3.8	14.3
30 x 35.....	3.9	2.5	8.1
35 x 40.....	4.7	3.9	8.3
40 x 50.....	9.6	5.6	15.1
50 x 60.....	4.1	3.0	6.7
60 x 100.....	8.3	7.8	15.1
100 x 200.....	5.7	6.7	6.1
200 x 325.....	2.9	5.3	1.2
325 x 0.....	25.9*	49.0†	3.8
	100.0	100.0	100.0
Percent solids.....	13.4	8.0	52.9
Tons per hour.....	47.0	25.0	...

\* 35.1 lb per ton of coal washed.

† 33.9 lb per ton of coal washed.

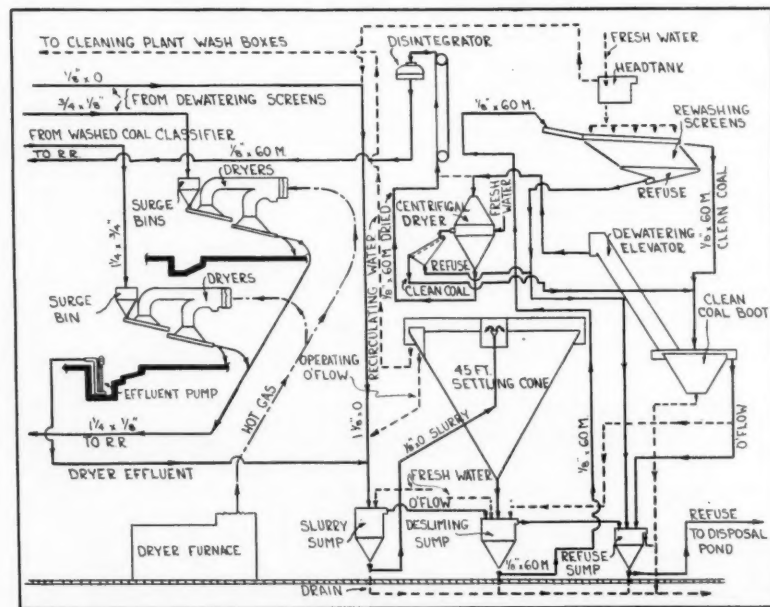
‡ The fine coal plant refuse does not include fine coal and clay (minus 60 mesh) removed by desliming cone, clean coal boot, and feed tank as shown in the flowsheet.

screens and heat dryers, goes to a mixing and blending conveyor for loading into railroad cars. The cleaning plant requires 1300 gpm of make-up water; the jigs use 12,000 gpm which is recirculated. The percentage of solids contained in the plant water with their size consist is shown in table A (sieve analyses are by the wet-screening method using U. S. standard screens).

The sludge recovery process is applied to the heat dryer effluent and to the  $\frac{1}{2}$  in. by 0 through-product of the dewatering screens. Formerly this material was wasted and amounted to 47 tph. An average of 22 tph of  $\frac{1}{2}$  in. by 60 mesh marketable coal is

now reclaimed with only the minus 60 mesh going to the disposal pond. This represents a recovery of nearly 50 percent. The process of separating the fine sizes into clean coal and refuse is summarized briefly below.

The  $\frac{1}{2}$  in. by 0 from the main dewatering screens goes through a slurry sump to a 45-ft settling cone and from there to the desliming sump. Overflow, containing minus 60 mesh material, is pumped from the refuse sump to the disposal pond. The  $\frac{1}{2}$  in. by 60 mesh from the cone passes over dewatering screens and from there the reclaimed clean coal is taken through a centrifugal dryer to the mixing and blending conveyor for



Plant A recovers sludge from dryer effluent and through-product of dewatering screens

loading the railroad cars. The  $\frac{1}{2}$  by  $\frac{1}{2}$  in. from the main dewatering screens and the  $\frac{1}{2}$  by  $\frac{1}{2}$  in. from the classifier screens goes through heat dryers and from there both sizes pass to the mixing and blending conveyors. The dryer effluents are sized with the  $\frac{1}{2}$  in. by 0 and treated for sludge recovery as described.

### MINE B—Southern Illinois No. 6 Seam

THE preparation plant, designed to handle 700 tph of raw coal, has facilities for reclaiming fine sizes that were normally wasted as sludge. The cleaning process follows more or less conventional practice. Coal delivered from the strip pits in trucks is dumped into a hopper from which it is fed into a double roll breaker. This product is separated by the primary raw coal screens into three sizes—plus six in., 6 by 3 in., and 3 in. by 0. The plus six in. goes through a single roll crusher. The product from the screens and the crusher is treated in two jigs; one handling the 6 by 3-in. size and the other the 3 in. by 0. Refuse from the jigs is taken to the waste bin and from there to slate

TABLE B—PERCENTAGE BY WEIGHT OF SOLIDS IN WASTE WATER

Size	Before Sludge Recovery	After Sludge Recovery
Plus 4 mesh.....	0.8	0.1
4 x 8.....	17.9	7.2
8 x 10.....	5.3	2.4
10 x 16.....	18.1	8.3
16 x 18.....	4.9	2.8
18 x 20.....	4.8	3.4
20 x 30.....	8.8	6.6
30 x 35.....	4.2	4.6
35 x 40.....	4.9	3.7
40 x 50.....	6.1	7.1
50 x 60.....	2.9	3.7
60 x 100.....	5.9	7.8
100 x 200.....	4.1	6.5
200 x 325.....	2.1	12.6
325 x 0.....	9.2*	23.2†
	100.0	100.0
Percent solids.....	20.1	13.2
Tons per hour.....	45.0	18.0

\* 15.1 lb per ton of washed coal.

† 14.5 lb per ton of washed coal.

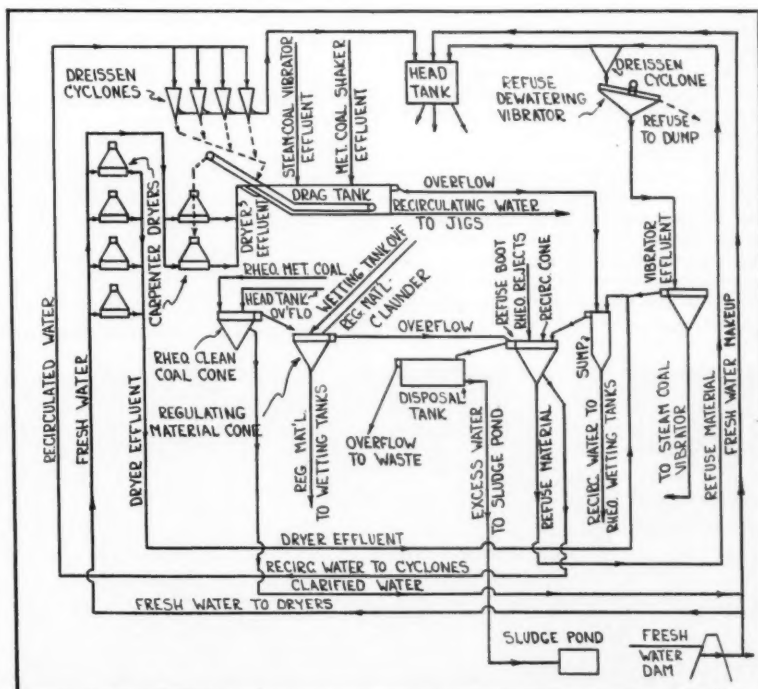
disposal in abandoned strip pits. Clean coal goes to the classifying screens where the plus  $\frac{3}{4}$ -in. product is separated for final sizing, mixing, blending and loading into railroad cars. The minus  $\frac{3}{4}$  in. is treated for sludge recovery. The cleaning plant requires 700 gpm of makeup water; the jigs require 8000 gpm which is recirculated and the percentage of solids in plant water with their size consist is shown in Table B. Sieve analyses, again, are by the wet-screening method using U. S. standard screens.

Sludge is recovered from two sizes—



The diagram illustrates a coal processing system with the following components and flow paths:

- 6"x0 WASHED COAL FROM JIGS**: The starting point of the process, which splits into three main paths.
- Path 1 (Top)**: Flows through **CLASSIFIER SCREENS** and then to a **MIXING & BLENDING CONVEYOR - TO RAILROAD CARS**.
- Path 2 (Middle)**: Flows through a **2 mm. x 0** screen, then to a **SUMP**, and finally to a **SETTLING CONE**.
- Path 3 (Bottom)**: Flows through a **10M x 0** screen, then to a **3/4" x 2 mm.** screen, and finally to a **DEWATERING SCREENS**.
- Water Management**: **RECIRCULATING WATER** is added to the system. It flows from the **SETTLING CONE** through an **OVERFLOW** into a **DRYER**, then to a **THERMAL DRYER**, and finally back to the **SUMP**.
- Final Disposal**: Material from the **DRYER** is sent **TO SLURRY POND**.



*This is a  
Coal Division  
Report*

practice it is proportioned between metallurgical and steam grades according to market requirements.

The major portion of the fine solids in the jig circuit is recovered in the drag tank. The wash box water is relieved of much of its solids when it passes through four 14-in. cyclones before being pumped to the head tank for recirculation. Rejects are thickened by passing them through an 18-in. cone, thence to a vibrator for dewatering. Water recovery is an important function of the cyclones. No figures of any value are available on quantities of makeup water and waste water due to difficulty of installing suitable metering devices.

Tables C1 and C2 will serve to indicate the results obtained on the four 14-in. cyclones, together with the characteristics of feed, overflow and underflow products. The cyclones are recovering up to 150 tpd of fine coal, much or all of which would otherwise be wasted. Water clarification is important. It permits reuse of water without pumping it back to the sludge pond and helps avoid wasting of water. Cyclone nozzle replacement has not been a major item of expense, although their life is relatively short.

TABLE C-1—OPERATING TEST RESULTS WITH 14-IN. CYCLONES  
VARYING BACK PRESSURE CONDITIONS ON OVERFLOW  
(Overflow orifice 2½-in. Underflow orifice 1-in.)

Back Pressure	Percent Solids in Underflow (Avg.)	TPH Recovery Dry Basis
Excessive	54.5	21.26
Partially Removed	68.5	29.47
All Removed	61.8	13.68

TABLE C-2—RESULTS OF CYCLONE TESTS

	Feed	Overflow	Underflow
Nozzle Diameter—Inches	2	2½	1¼
Line Pressure psi	245-250		
Volume Rate gpm	212.9	185.1	27.8
Solids Rate tph	6.22	1.86	4.36
Solids W and %	11.42	3.98	56.6
Solids Distribution %	100.0	29.8	70.2
Volume Distribution %	100.0	86.9	13.1
Water Distribution %	100.0	93.07	6.93

SCREEN ANALYSIS—PERCENT BY WEIGHT

	Feed	Overflow	Underflow
Plus 4 Mesh	0.2	0.0	0.3
4 x 10	2.5	0.0	3.6
10 x 20	8.4	0.0	11.9
20 x 40	14.3	0.2	20.3
40 x 60	14.8	0.7	20.8
60 x 100	12.8	1.4	17.6
100 x 140	7.5	2.4	9.7
140 x 200	6.9	8.5	6.2
Minus 200	32.6	86.8	9.6
	100.0	100.0	100.0

## Sludge Recovery to Prevent Stream Pollution

By V. D. HANSON

### MINE D—Western Pennsylvania

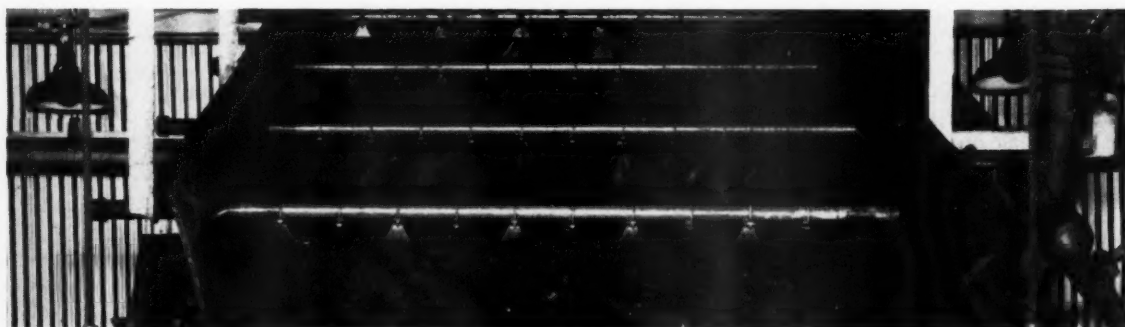
THIS installation recovers minus 48-mesh coal from the waste discharge of a heavy media plant treating the Pittsburgh seam. The rate of raw coal feed to the preparation plant is 1150 tph of eight-in. rom. This material is treated in three sizes—3 by 8 in. in the first heavy media units, ¾ by 3 in. in the second units and the minus ¾ in. in open discharge wash boxes. The cleaning plant requires 350 gpm of make-up water and has a total of 11,000 gpm in recirculation. Waste to the sludge pond amounts to only 20 gpm.

Minus 48-mesh material from the wash boxes is treated for sludge recovery. This material passes through two thickeners; of 35-ft and 60-ft diam-

eter, set in series. Their underflow is treated by oil flotation with the flotation tailings going to an 85-ft thickener. Solids in the final overflow are recovered on a cloth filter; underflow going to the sludge pond. The solids in the 48-mesh flotation feed vary from 40 to 45 percent; the final sludge to the waste pond has 50 percent solids with ash content of 40 percent.

TABLE D-1—SCREEN ANALYSIS OF THICKENER UNDERFLOWS  
PERCENT BY WEIGHT OF SOLIDS

	60-ft Thickener Underflow	35-ft Thickener Underflow	85-ft Thickener Refuse	Clear Coal Filter Cake
Plus 48 Mesh	23.6%	7.7%	1.5%	16.4%
48 x 100	34.0	11.7	6.2	34.4
100 x 200	19.4	25.7	38.2	24.2
Minus 200	23.0	54.9	54.1	25.0
	100	100	100	100



Wet screening for fine sizes

# Decreasing Ball Mill Maintenance

By JOHN E. HYLER

John E. Hyler and Associates

ANY way one looks at it, practically all parts of a large ball mill take heavy punishment. Heavy abrasion and impact on the mill interior, vibration of the entire unit, exceedingly-heavy load on the mill bearings, and in some cases vibration imparted to the driving motor, add up to a heavy maintenance schedule. To this may be added ball wear.

Whether one considers ball replacement as a part of maintenance cost or not, it pays to buy balls of high quality. Balls which will offer greatest length of life under given conditions, and that will grind uniformly are preferred naturally. There are various sources of supply for forged steel balls in any diameter desired, from a ½ or ¾-in. minimum up to five in. Some manufacturers use special-analysis steel and heat treat the balls with high accuracy to take the punishment of long heavy runs.

Ball mill linings are important in

reference to the maintenance schedule from two standpoints. One is their length of life. The other is the ease with which they may be installed. There are various reputable sources for such linings. Among them are manufacturers of ball mills. Others are the specialists in this line. When linings are made accurately to size, and in easily-handled sections, they save hours of installation time, and thereby reduce down time.

### Down Time vs. Upkeep

Where down time is reduced, the amount saved may logically be evaluated, and subtracted from maintenance costs. Some linings are made in interchangeable sections. If wear localizes either at the feed or the discharge end of a mill, its effect may be offset by shifting the plates to opposite ends of the mill. This results in longer life for linings and consequent lower grinding costs.

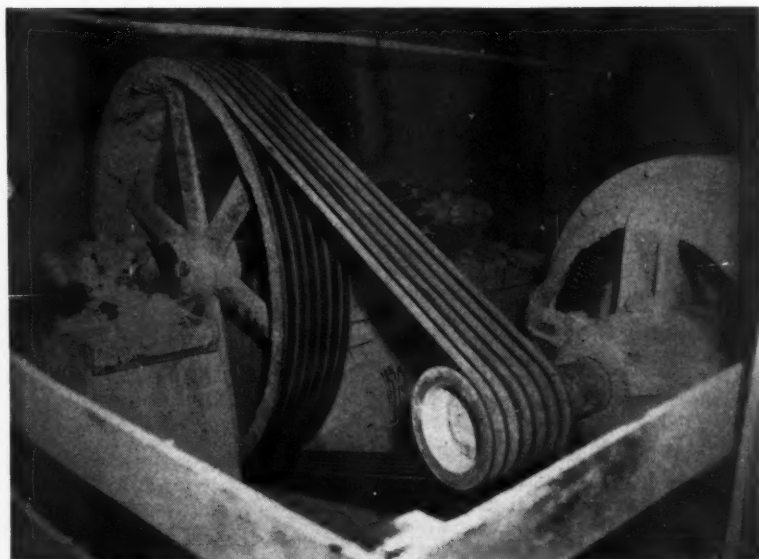
Bearings of large ball mills have a tough assignment in any case, due to the exceedingly-heavy load they must carry. If bearings are not in perfect alignment, trouble will be encountered. Misalignment is bad in any case, but on heavily loaded bearings, a slight misalignment will have a far more detrimental effect than in cases where bearings are less-heavily loaded. Particularly hard punishment falls on these bearings during initial starting, after a shut-down.

In this respect, an interesting feature of some ball mills is the fact that they are fitted with so-called trunnion bearings of large area. Such bearings are designed to provide a spherical seat, which automatically corrects any minor misalignment of the bearings and the mill. Since they automatically accommodate themselves to the mill, it follows that the load is always distributed with perfect uniformity across the full face of the bearing. They are also provided with a housing with a self-enclosed oiling system to insure unflinching lubrication.

### Hand Pump Floats Mill

In addition to this, some of the large bearings are fitted with a hand-operated lubricant pump. This pump is used only to float the mill prior to starting. Floating by hand pump in this way eliminates high starting torque. It is estimated that 65 to 75 percent of bearing wear on a heavily-loaded mill occurs during initial starting. Thus the value of floating the mill with the hand-operated pump is readily apparent.

The amount of vibration that must be absorbed by a motor driving a ball mill depends largely on the type of drive employed, or on the means by which the motor is connected to the mill. On direct drives, all possible care should be exercised to interpose one or more flexible couplings between motor and mill. Direct drives are chiefly employed on heavier mills. Regardless of how carefully a mill may have been installed and aligned with the motor, there is always the possibility that a certain amount of misalignment will occur after installa-



Properly designed V-belts make indirect drive of heavy ball mill possible



tion and will have to be corrected.

In nearly all cases, the immediate drive at the machine is from a pinion to a large gear. The problem is therefore properly to connect the driving motor with the pinion shaft. Several types of flexible couplings may be employed. Gear-type flexible couplings are very good. So is the coupling which incorporates flexible steel plates as the flexible component of the drive. If it is not expected that misalignment will be severe, a single coupling can often be employed to advantage.

### Up Compensation Capacity

A double coupling, or even two couplings separated by a so-called floating shaft, may be superior. Where a floating shaft is employed, more severe misalignment may be tolerated. The longer the floating shaft, the greater is the amount of misalignment the drive will accommodate. It is also an interesting fact that where parallel misalignment occurs (very difficult to handle with a single flexible coupling) it is so distributed between the two couplings by the floating shaft that each of the couplings need compensate only for angular misalignment.

There are definite electrical problems to be considered in selecting and installing a motor for a heavy ball mill drive. These vary with different sizes of mills. It is usually wise to confer with ball mill manufacturers, (or with motor manufacturers who have specialized in providing motors for such service) with regard to the type of motor which will best serve in any given case.

There are many ball mills for which an indirect drive is employed. In such cases some sort of speed-reducing system between the motor and the machine is used. This is often accomplished through use of a V-belt drive. A drive of this type is far less costly, and it has the advantage that speed adjustments can be made by selecting the proper motor sheave. Where usable, V-belts are particularly desirable since they also absorb shocks in the drive and isolate the motor from punishing vibration.

### Indirect Applications

There are some differences of opinion touching the maximum size of ball mill that should be powered by an indirect V-belt drive. One factor is the type of V-belt used. In the illustration, a V-belt drive to a ball mill is seen. The six V-belts first used were unsatisfactory. The ball mill being turned by this drive contained 22 tons when loaded. The original V-belts were unable to take the punishment. In this case, it was felt that redesigning the drive would cost considerably more money than could well be afforded if there were any way to avoid it.

Grommet type V-belts were sub-

stituted because it was felt they could pull the heavy load with a higher safety factor. Where the original V-belts lasted only five or six weeks, making replacement costs over \$100 per month, the grommet belts now

being used were still in good condition during their sixth month of service. This experience proved that use of high-strength V-belts on a ball mill drive makes feasible this type of indirect drive on heavier mills.

## New FluoSolids Experience

(Continued from page 44)

for sulphatizing. Gas strength will be about three or five percent  $\text{SO}_2$  instead of 10 or 11 percent.

### Produce Flotation Reagents

A unique application of sulphatizing roast on sulphur concentrate comes from Australia where one producer proposes to install two small FluoSolids units for the production of copper sulphate and zinc sulphate flotation reagents from their respective base metal concentrates. Concentrates are simply roasted, quenched in water, and the pulp or leach liquor used as a reagent. This application should be of considerable interest to many flotation plant operators who have access to sulphide concentrates of these metals.

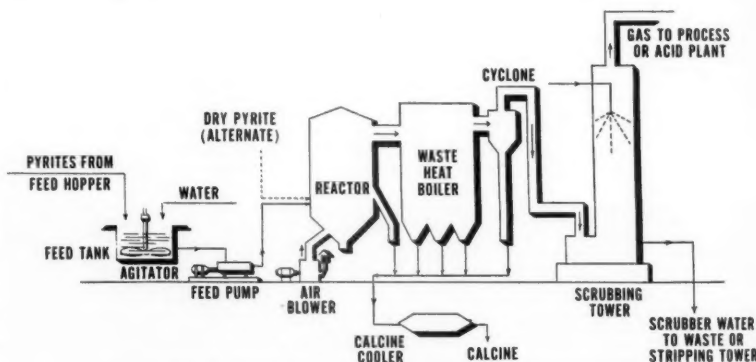
### Treat Mineral Grains

FluoSolids Processes have been developed and are in commercial operation at the present time for the heat

the surfaces of some mineral grains to improve differential flotation separation of complex ores.

Successful pilot plant tests have been completed in the field of beneficiation of low-grade iron ore. Advantage is taken of the fact that FluoSolids Systems can be operated in a reducing or oxygen deficient atmosphere to convert hematite to magnetite so that separation of iron from insolubles can be readily accomplished in conventional magnetic separators. The scope of this approach to the low-grade iron ore field appears to be limited only to the cost of fuel necessary for the reaction, and much will be heard from this process as more of the low-grade deposits are brought into the steel picture.

Reburning of lime mud from water treatment and other process plants has been a new FluoSolids development. Pilot plant operations at Lansing, Mich., water treatment plant were carried on successfully over a two-year period, and a 30-ton per day commercial unit is now being designed. Lime produced by the FluoSolids technique from lime sludge is



Where fuel is scarce waste heat boilers are a necessary adjunct

treatment of mineral grains. Fuel economy is usually the most important consideration in applications of this sort, and since the heated fluidizing gas in a FluoSolids unit of this type passes directly through the grains so treated, maximum utilization of calorific input is possible. Units of this type are well suited to such applications as: removal of trace flotation reagents which are troublesome in subsequent chemical processes; elimination of carbonaceous matter or volatiles; heat treatment to improve physical character of certain abrasive grains; and heat treatment to partially or wholly oxidize

very uniform in physical and chemical composition, and is recovered as closely sized pellets which are easily handled and have real consumer appeal. Other such plants are being projected for the future.





# Wheels of GOVERNMENT



AS Viewed by A. W. DICKINSON of the American Mining Congress

AS Congressional Committees proceed with various investigations and with consideration of an extension of the Defense Production Act, reorganization of the Treasury, the St. Lawrence Seaway and Power Project, and Federal Coal Mine Inspection, the wheel-horse work toward an early campaign year adjournment is being carried on in the House Appropriations subcommittees who are readying the departmental and agency supply bills for early floor consideration.

Taxwise, Senate Finance Committee Chairman George has told Treasury Secretary Snyder that he "does not expect a general tax increase in 1952." The Senator is known to feel that tax reduction is in order, perhaps by next year.

The Administration's plan for reorganizing the Bureau of Internal Revenue has cleared the House and is now before the Senate Committee on Executive Expenditures. Senator George is outspoken on this matter and, in vigorously opposing the plan, has told the Committee that it contains radical innovations which would seriously impair and hamper the collection of taxes.

## Defense Production Act

Hearings open before the Senate Committee on Banking and Currency March 4, on the Administration bill which would extend the Defense Production Act to June 30, 1954. The President has asked Congress to repeal the Capehart and Herlong amendments, restore livestock slaughtering quotas, increase authority for commodity production loans and purchase commitments, and remove restrictions on Government price controls. The general sentiment in Congress is for a one-year extension or less.

In the apparent hope to counter mandatory decontrol provisions, the Office of Price Stabilization on February 10 established a Committee to study decontrols on commodities selling below price ceilings. The Committee is under instruction to study means of reducing or removing the burden of record keeping and reporting, and the feasibility of early decontrols.

## Renegotiation

The Renegotiation Board hopes to soon publish the revised regulations, based on the tentative announcement made public January 10. It has been indicated that the raw materials exemption list will be carried in the same form as in the tentative regulations, subject to further Board consideration.

Regional offices established by the Board now include: Boston—Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island; Detroit—Ohio and Michigan; New York—New York State; Washington—Pennsylvania, New Jersey, Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Kentucky and Tennessee; Chicago—Illinois, Indiana, Wisconsin, Missouri, Iowa, Minnesota, Nebraska, North Dakota, South Dakota, Kansas, Arkansas, Oklahoma, Texas, Mississippi and Louisiana; Los Angeles—California, Nevada, Utah, Arizona, Washington, Oregon, Idaho, Montana, Wyoming, Colorado and New Mexico.

## Stockpiling

The latest announcement by the Munitions Board of the value of materials in the national stockpile at the close of 1951 is \$3,493,717,000, with \$2,209,247,000 obligated against future deliveries. In its report to Congress the Board states that the program of stockpiling strategic and critical materials has been slowed down by mobilization requirements, strikes, high prices, and world shortages. The report further states that during July to December over \$120,000,000 in aluminum, copper, lead, zinc and other materials had to be diverted to defense industries and that \$40,000,000 worth of aluminum, copper and lead were taken out of the stockpile to supply the needs of industry.

## St. Lawrence Project

Heavy pressure for joint action with Canada on the St. Lawrence Seaway and Power Project has resulted in the opening of hearings before the Senate Committee on Foreign Affairs on Sen-

## Washington Highlights

★ ★ ★ ★ ★ ★ ★ ★  
**CONGRESS:** Weighing Administration program.

**DEFENSE ACT:** Up for extension.

**RENEGOTIATION:** Board studies regulations.

**STOCKPILING:** Metals diverted to industry.

**ST. LAWRENCE:** Drive on to join Canada.

**FREIGHT RATES:** Coal Producers oppose increase.

**COAL MINE INSPECTION:** Neely bill reported to Senate.

★ ★ ★ ★ ★ ★ ★ ★

ator Green's (Dem., R. I.) authorization bill. Senator Taft (Rep., Ohio) and other Senators have introduced an amendment under which the United States would finance its part of the work through issuance of \$485,000,000 in bonds by a "St. Lawrence Authority." These Senators now believe that with Canada prepared to carry out the project by itself, the U. S. would thus lose any part in control and in the fixing of tolls. Numerous witnesses from Federal departments urged U. S. participation in the project, discounting the military vulnerability and emphasizing that the Soo Canal is equally vulnerable and is also blocked by ice.

## Freight Rates

ICC hearings were concluded February 22 on the railroads' petition for the full 15 percent freight increase sought last year. As of August 1951 a temporary 6 percent increase was granted for western and southern railroads, with 9 percent for eastern lines. Leading coal producers have told the ICC that the industry cannot absorb any further increases and that such an action will definitely reduce carrier revenue and drive consumers to the use of competitive fuels.

## Coal Mine Inspection

A revised Neely (Dem., W. Va.) Federal Coal Mine Inspection bill has

(Continued on page 61)

# 1952 Coal Convention

SOME recent predictions of future coal production have forecast 600,000,000 tons in 1952 and one billion tons in 1975. These figures reflect present industrial trends and are not mere wishful thinking. To attain these goals all of the technical knowledge and know-how of the industry will have to be brought into full play. That is why wise men are making plans to attend the Coal Convention in Cincinnati on May 5, 6 and 7. Much valuable information will be gained from the meetings and personal contact with others in the industry.

Headed by Chairman K. A. Spencer, the Program Committee has left no stone unturned to provide sessions which will be of the greatest value

to those in attendance. A glance at the Advance Program will show that they have done a great job in selecting pertinent and diversified subjects. The luncheon speakers have also been selected with the thought in mind of giving some interesting side lights on problems common to the industry.

Entertainment, an incidental but important part of any convention, has been taken care of in an especially thorough manner. Monday night is the time of the Coal Miners Party. Coney Island, Cincinnati's famous amusement park, has been reserved for the occasion. Following a buffet supper, there will be an evening of music, dancing and entertainment—

(Continued on page 59)



**K. A. SPENCER**  
National Chairman  
Program Committee

## Advance Program

### MONDAY—MAY 5

#### 10:00 am—Opening Session

**New Developments for Coal Utilization**—A factual discussion of how coal can meet future production demands and what new techniques, such as pipeline transportation, must be developed.

**Joseph Pursglove, Jr.**, Vice-President, Research and Development, Pittsburgh Consolidation Coal Co.

**Materials and Machinery for Coal Mines**—Explaining the latest developments in Government priorities and allocations assistance to the mines and to mining equipment manufacturers.

**Charles W. Connor**, Administrator, Defense Solids Fuels Administration.

**Edward T. Klett**, Deputy Administrator, Defense Solid Fuels Administration.

**Harold A. Montag**, Director, Mining Machinery Division, National Production Authority.

#### 12:15 pm—Luncheon

Guest Speaker to be Announced.

#### 2:15 pm—Roof Support Session

**Wet and Dry Drilling for Roof Bolting**—Describing several types of track and tire mounted roof drilling equipment and showing how roof bolting is coordinated with the operating cycle.

**Compressed Air Drills:**

**C. E. Linkous**, Director of Safety, Island Creek Coal Co.

**Rotary Electric Drills:**

**L. F. Lumaghi**, President, Lumaghi Coal Co.

**Roof Bolting in Pillar Recovery**—A comparison of results between roof bolting and conventional timbering based on actual pillar extraction under different classes and depths of cover.

**James L. Gilley**, Mining Engineer, U. S. Bureau of Mines.

**Overall Economies of Roof Bolting**—Showing the economies, under various roof conditions, over conventional timbering methods.

**Donald B. Shupe**, Superintendent, Eastern Gas & Fuel Associates.

#### 2:15 pm—Strip Mining Session

**Overburden Blasting Techniques**—Studies made by split-second sequence photographs furnish visual evidence on control of breakage, coal degradation, throw and vibration.

**John L. Romig**, Assistant Manager, Technical Division, Atlas Powder Co.

**Road Construction and Maintenance**—Past methods of road construction have not withstood protracted severe winter conditions. New techniques in methods and materials, based on tests and recommendations by Purdue University, are proving satisfactory.

**S. F. Sherwood**, General Manager, Central Indiana Coal Co.

**Rotary Drilling in High Overburden**—Describing types of equipment used, diameter of the shot holes for different classes of rock strata and depths of cover, including details of overburden removal.

**Practices in Eastern Ohio:**

**J. S. Harmon**, General Superintendent of Stripping, Hanna Coal Co.

**Practices in the Anthracite Field:**

**Talhurst Butler**, Central Pennsylvania Quarry Stripping & Construction Co.

### Monday Evening—Coal Miners' Party

Coney Island Amusement Park

### TUESDAY—MAY 6

#### 10:00 am—New Developments Session

**Breaking Coal at Face with Chemechol**—Outlining a new technique using chemicals instead of conventional methods for breaking a coal face.

**R. D. Hedreen**, Assistant Manager of Chicago Sales Office, E. I. duPont de Nemours & Co., Inc.

**Longface Mechanical Mining**—A panel of coal operators will discuss experiments in this country using European-designed equipment for mining coal out of the face.

**The Samson Stripper:**

**Richard Todhunter, Jr.**, General Manager, Barnes & Tucker Co.

**Meco-Moore Longwall Machine:**

**A. B. Crichton, Jr.**, Vice-President, Johnstown Coal & Coke Co.

**Lobbe Coal Plow:**

**W. A. Haley**, Mining Engineer, U. S. Bureau of Mines.

**Auger Mining Underground**—This type of equipment, which has had wide use in strip highwall mining, is now going underground and the paper will give results of actual operations.

Speakers to be Announced.



### 10:00 am—Underground Haulage Session

**Slope Sinking at Peabody No. 10 Mine**—An account of some rather unusual methods used in sinking a belt conveyor slope and a description of the belt installation.

Lyle Morris, Division Engineer, Peabody Coal Co.

**Modern Underground Track Haulage Systems**—Accounts of transportation systems from two mining fields. Will include dispatching and communications by trolley and mine phone.

#### Main Line Dispatching:

Walter R. Kirkwood, Chief Mine Inspector, Tennessee Coal & Iron Division, U. S. Steel Co.

#### Gathering and Service Haulage Operation:

B. M. Neel, Assistant General Superintendent, Stonaga Coke and Coal Co.

**Underground Belt Conveyors**—Covering improved practices for installing, operating and maintaining belt conveyors used for main line and gathering service.

**Factors Affecting Operating and Maintenance Costs:**

A. E. Long, General Superintendent, Clearfield Bituminous Coal Corp.

#### Central Shop for Belt Repairs:

W. A. Haslam, Assistant to Vice-President, The New River Co.

### 12:15 pm—Luncheon

**Guest Speaker:** Dr. Kenneth McFarland, Educational Consultant, General Motors Corp.

### 2:15 pm—Continuous Mining Session

**Progress Review of Continuous Mining**—A panel of coal operators will present a symposium of experiences with various types of continuous machines, including operating details such as mining plan, service haulage, size consist, dust control, etc.

#### BCR Coal Buster:

Gerald Von Stroh, Director, Mining Development Committee, Bituminous Coal Research.

#### Goodman Mining and Loading Machine:

H. C. McCullum, Consulting Engineer, Chicago.

#### Jeffrey Colmol:

Frank R. Zachar, General Superintendent, Christopher Coal Co.

#### Joy Continuous Miner:

Milton H. Fies, Manager Coal Operations, Alabama Power Co.

**Pillar Extraction with Continuous Machines**—Giving time analyses and cost data comparing continuous with conventional machines on chain and barrier pillar extraction.

J. A. Younkins, Assistant General Superintendent, Duquesne Light Co.

### 2:15 pm—Strip Mining Session

**Strip Mining in Deep Overburden**—Accounts of bituminous and anthracite methods in strip mines with from 50 to 90 ft of cover, showing types of equipment and operating practices.

#### Methods in Bituminous Fields:

Arthur F. Lee, District Engineer, Traux-Traer Coal Co.

#### Methods in the Anthracite Field:

Paul Goddard, Vice-President, Carey, Baxter & Kennedy, Inc., Contracting Engineers.

**Stripped Land Rehabilitation**—A report of how rehabilitated strip pits have served to build goodwill within adjacent farming communities.

Frank J. Foresman, Personnel Director, Pittsburg & Midway Coal Mining Co.

**Stripped Land Use Developments**—A presentation by members of the AMC Land Use Committee outlining methods of strip land reclamation that are under successful development by coal and other mineral mining industries.

Thos. C. Chesley, Chairman, AMC Land Use Technical Committee.

## WEDNESDAY—MAY 7

### 10:00 am—Power and Maintenance Session

**Modern Lubrication Practices**—Two speakers will cover the important subject of lubrication for surface and underground equipment including the latest practices in handling and distributing oil to the working panels and its application to the face machines.

#### Centralized Lubrication for Preparation Plants:

R. M. Johnson, Vice-President, Blue Bird Mining Co.

Additional Speaker to be Announced.

**Underground Power Transmission**—Describing installation and operating methods designed for safety and efficiency in transmitting electric power from the substation to the machines in the working panels.

Urban F. Toucher, Chief Electrician and Master Mechanic, Union Pacific Coal Co.

**Maintenance for a Continuous Mining Section**—A comprehensive account of how maintenance work is correlated with production, showing the maintenance organization at the mine and at the shops; explaining how the crews function in inspecting, repairing and rebuilding the underground equipment.

J. J. Snure, Production Manager, and G. W. Stump, Assistant Production Manager, Rochester & Pittsburgh Coal Co.

### 10:00 am—Safety Session

**Prevention of Fires to Underground Conveyor Belts**—Covering installation and maintenance procedures to reduce fire hazard; giving results of investigations and tests in this country and abroad to determine how belt fires are caused and how they may be prevented.

C. W. Thompson, Manager, Weirton Steel Company Division, National Steel Corp.

**Handling Man Trips From Portal to Working Sections**—A presentation by two speakers describing special equipment designed for man trip handling underground with special attention to accident prevention; reducing travel time with new portals and man trip stations close to the working sections.

#### Man Trips with Belt Haulage:

Don Conaway, Engineer, Robinson & Robinson, Consulting Engineers.

#### Man Trips with Rail Haulage:

F. F. Stewart, Superintendent, Jewell Ridge Coal Co.

**Coal Dust Control Underground**—Giving results of long experience and wide studies on dust problems applied to both anthracite and bituminous mining; stressing methods for prevention of explosion and health hazards.

R. Emmet Doherty, Engineer, Anthracite Institute.

### 2:15 pm—Coal Preparation Session

**Heated Cloth Screening**—A manufacturer and an operator describe how electric heating of wire cloth used in coal screening prevents blinding and increases fine coal recovery.

John E. Dunn, Processing Machinery Dept., Allis-Chalmers Mfg. Co.

Milo W. Summers, Vice-President, Westmoreland Coal Co.

**Preparation and Recovery of Fine Coal From Slurries**—A comprehensive discussion of a most timely subject showing how sales realization is increased by recovery of fuel values from former preparation plant wastes and how washery water is clarified for reuse.

James P. Blair, Coal Preparation Engineer, Heyl & Patterson

**Dense Media Separation by Tromp Process**—A description of a new installation showing the application of a dense media process to southern Illinois coal, describing the flow of coal through the preparation plant and treatment of various sizes.

J. W. MacDonald, Chief Engineer, Old Ben Coal Corp.

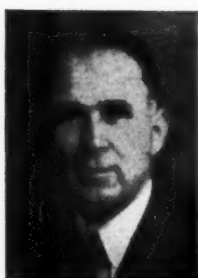
### 7:00 pm—Annual Banquet

Honored Guests will be introduced, with no speeches, followed by special entertainment.

## Members—Program Committee



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*Old Ben Coal Co.*



J. R. Bazley  
*J. Robert Bazley, Inc.*



C. R. Bourland  
*The New River Co.*



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*U. S. Steel Co.*



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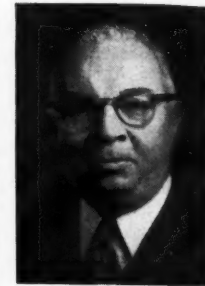
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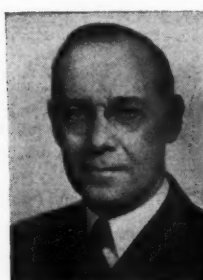
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R. U. Jackson  
*Hewitt-Robins Inc.*



W. B. Jamison  
*Jamison Coal Coke Co.*

plus all the attractions of the great playground. Tuesday night is baseball night. There will be a night game between the Cincinnati Reds and the Brooklyn Dodgers. A special "Mining Congress Section" has been arranged for the event. The Annual Banquet will be held on Wednesday evening. This highlight of the coal mining year will feature fine food, good music, great entertainment and no speeches. A special program of daytime entertainment has been outlined for the ladies to keep them occupied while their men are attending the meetings.

Mailings have already gone out with entertainment order forms and

advance registration cards. Tickets for all entertainment functions except for the baseball game will be sent by registered mail in mid-April. Baseball tickets are to be purchased from The Cincinnati Baseball Club, 307 Vine Street, Cincinnati 2, Ohio. Box seats are \$2 and \$2.25 each while reserved grandstand seats are \$2 and

\$1.75 apiece. Checks should be enclosed with the ticket orders.

As in the past, room reservations may be made through the Cincinnati Convention and Visitors Bureau, Inc., Dixie Terminal Building, Cincinnati 2, Ohio. A letter, wire or phone call will assure the best available accommodations.

(Photos not available)

L. E. Bassham W. H. Cooke  
Harlan Wallins Coal Little Sister Coal Corp.  
Corp.

David Ingle, Jr. J. G. Puterbaugh  
Ingle Coal Co. McAlester Fuel Co.



Walter J. Johnson  
Sheridan Wyoming Coal  
Co.



Chas. E. Lawall  
Chesapeake & Ohio  
Railroad



J. B. Long  
Long Super Mine Car Co.



D. L. McElroy  
Pittsburgh Consolidation  
Coal Co.



M. C. Miller  
Sun Oil Co.



R. E. Moore  
C. A. Hughes & Co.



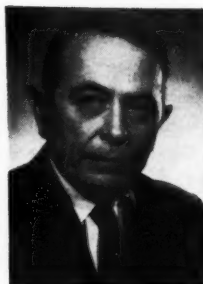
C. R. Nailer  
Christopher Coal Co.



James M. Osborne  
Youghiogheny & Ohio  
Coal Co.



Moss Patterson  
West Kentucky Coal Co.



Hewitt Smith  
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Co.



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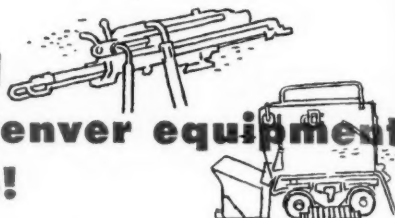




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**you'll find  
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**THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS**

## Correction

In the annual review of the Phosphate Industry by James A. Barr in the February 1952 issue page 102, column two, the sentence which reads "Swift & Co. have a five mile pipeline" should read "The Virginia-Carolina Chemical Corp. has a five mile pipeline."

## Wheels of Government

(Continued from page 55)

been reported to the Senate by the Committee on Labor, following four days of hearings in late January and early February. The measure grants police powers to U. S. Bureau of Mines inspectors and authorizes the Department of Interior to promulgate safety regulations. Wilful failure to correct violations of Federal regulations is made a misdemeanor, punishable by a fine not exceeding \$2,000 or by imprisonment not exceeding six months, or both. If a Federal inspector's order to withdraw men from a mine is disregarded, it would be a felony punishable by \$10,000 fine, three years imprisonment, or both.

Meanwhile a House Mine Safety subcommittee has concluded hearings on a companion to the Neely bill introduced by Rep. Price (Dem., Ill.), during which testimony was submitted by witnesses from the Department of the Interior and the U. M. W. of A. advocating immediate enactment (with strengthening amendments), by industry witnesses and representatives of State mining departments in outright opposition to the bill, and by industry witnesses who submitted an amended

version.

In the latter case Ed Schorr, a Cleveland attorney representing the Illinois Coal Operators' Association and the Coal Associations of Pennsylvania, Ohio, and Northern West Virginia, said that those whom he represents are in favor of enactment by Congress of Federal mine safety laws and Federal enforcement of such laws. Schorr submitted amendments to provide that: (1) Congress itself should enact the safety laws which are to govern the operation of mines—no Federal administrative bureau or agency should be authorized to draft and promulgate such laws; (2) when a U. S. Bureau of Mines inspector finds that imminent danger exists, he should issue an order to close the portion of the mine affected and keep it closed until such danger is eliminated; (3) even though a violation does not create imminent danger, the portion of the mine affected should be closed down if the violation continues after the operator has been notified and a reasonable time for abatement has expired; (4) adequate procedure should be provided by which the operator could appeal and get prompt judicial review of the order; (5) there should be provision making the violation of a closing order a misdemeanor punishable by fine and imprisonment; and (6) such legislation should contain appropriate language to insure that it will not be interpreted or held to supersede State laws pertaining to mine safety, except insofar as such State laws conflict with the Federal laws, and to insure that State laws which provide a greater degree of mine safety shall not be deemed to be in conflict with the Federal laws.

## BOOK REVIEW

**MESABI PIONEER**, *Reminiscences of Edmund J. Longyear*. Edited by Grace Lee Nute. Minnesota Historical Society, 116 pages, \$2.

THIS little book, *Mesabi Pioneer*, is Edmund J. Longyear's own story of his early search for iron ore in the wilderness of northern Minnesota. During his many years of engineering and drilling activity, vast tonnages of iron ore were developed, and the Mesabi Range became the principal source of the world's iron ore.

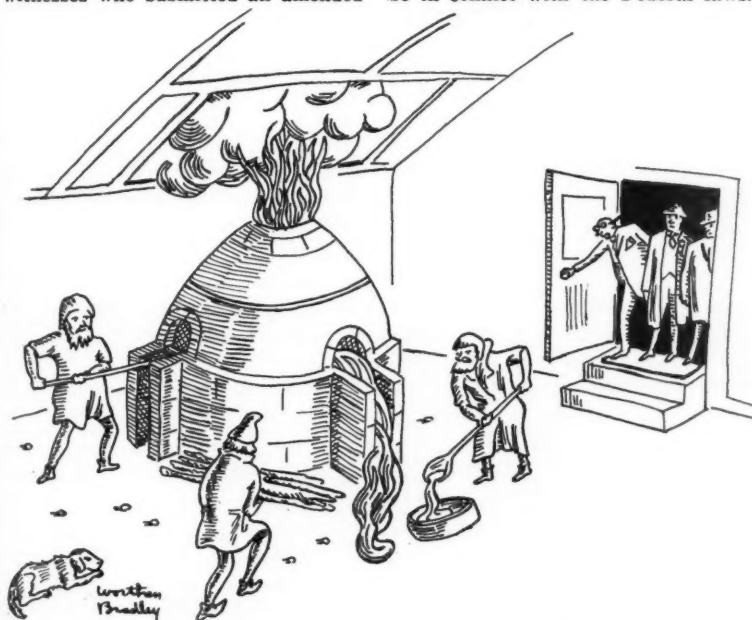
A simple narration of pioneer life and drilling experiences this book reflects the modesty and integrity of one of the first of those great men who helped transform the forested wilderness into a great mining empire.

Nearly everyone likes to read biographies of the titans of the past, but often breathes a sigh of relief when the book is finished. Here is one autobiography that one puts aside at last with a sigh of regret that it was not longer. The reminiscences of Edmund J. Longyear are an inspiration to anyone entering the mining industry and should make those with more experience proud to carry on the traditions that he, and men like him, have established.

**SYSTEM OF MINERALOGY**, *Seventh Edition*, By Charles Palache, the late Harry Berman and Clifford Frondel. Published by John Wiley and Sons, Inc., N. Y. Chapman and Hall, Ltd., London, 1124 pages, price \$15.00.

THE seventh edition of *The System of Mineralogy*, Volume II, published in November, 1950, has been rewritten and greatly enlarged by the prominent authorities. Volume II covers the halides, nitrates, borates, carbonates, sulfates, phosphates, arsenates, tungstates, molybdates, etc. Principal changes in the seventh edition include among others: a new mineral classification, based on crystal chemistry; a new elastic series of classification numbers or species; a new form of presentation of the crystallographic data; introduction of data derived from x-ray crystallography; revision of specific gravities, based on new observations; optical characteristics of opaque minerals; and expansion and annotation of the reference section to include sources of data, transformation formulas, lists of rare forms, general literature and a statement of controversial questions requiring clarification.

Dana has always been at the right hand of the mining engineers within the field. This new edition is more complete and more easily understood than any of the earlier printings.



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When cable repairs skyrocket costs so fast, it's poor economy to buy less than the best. A sample length of Securityflex\* Shuttle Car Cable will convince you that this super-safe, super-tough cable can speed your production and cut down those "bad" breaks that leave your men and machinery idle too long. Call your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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# Personals

The Inland Steel Co. has announced several changes in its coal mining organization. E. M. Pace has been appointed mining engineer assigned to special duties. H. B. Smith was appointed superintendent of the Price Preparation Plant succeeding E. M. Pace. R. A. Jimenez, preparation engineer, has assumed responsibility for the inspection of purchased coal, which duty heretofore has been under Smith's direction. Ralph Banks was appointed mine foreman at Price Mine No. 2, which went into production in November. J. H. Kelley was appointed mine foreman at Price Mine No. 1 succeeding Banks.

W. H. H. Cranmer, president and general manager of New Park Mining Co., was elected president and director of Tennessee Metals Corp., at a recent meeting of the board of directors of that concern.

G. A. Grosser, treasurer of the Old Ben Coal Corp., recently resigned because of ill health. He was succeeded by Earl G. Dunford, who has been with the company since 1925.

In accordance with the retirement policy of the St. Joseph Lead Co. Walter G. Patton retired as general traffic manager on December 31, after 39 years of outstanding efficient service.

Effective January 1, 1952, Michael A. Tubia, who was assistant traffic manager, succeeded Patton, and as general traffic manager will have his headquarters at 250 Park Avenue, New York 17, N. Y. At the same time, F. A. Schwab, who for many years has been in charge of Western traffic matters, was appointed traffic manager with offices at Bonne Terre, Mo.

C. W. Streit, Jr., executive vice-president and sales manager of the Southern Cement Co., has been elected president and general manager of the company to succeed George C. Walter, who is retiring.

Dr. Daniel C. Braun has been named medical director of Industrial Hygiene Foundation. He has been medical director of the Pittsburgh Coal Co. since 1944 and is a national authority on industrial health.

Several staff promotions, effective

January 1, have been announced by Anaconda Copper Mining Co. Chester H. Steele, head of the Butte mines geological department since January, 1948, has been made general manager of western mining operations. Succeeding



Chester H. Steele

Steele as geological department head is Edward P. Shea, who has been mines geologist since 1937. John W. Warren replaced A. S. Richardson, widely known ventilation engineer, as chief ventilation and industrial hygiene engineer



Edward P. Shea

for western operations of the company. Last November 1, Martin K. Hannifan was made assistant general superintendent of mines in charge of the Greater Butte Project. He is known as a specialist in mining by the block caving system.



John W. Warren

Major General Thomas F. Farrell, assistant general manager of the U. S. Atomic Energy Commission since August, 1951, has resigned to become managing director of ARO, Inc., which manages and operates the Arnold Engineering Development Center at Tullahoma, Tenn.

John J. Kodak, formerly resident engineer at Federal No. 1 Mine of the Eastern Gas and Fuel Associates, has been transferred to Keystone Mine as resident engineer replacing E. H. Bourland. E. B. Tubridy, Northern Division engineer, is filling Kodak's former position at Federal No. 1 in addition to his regular duties.

It was recently announced that John A. Wood was elected president of the New Mexico Mining Association. He was elected at the annual convention of the Association, held in Carlsbad, N. M.

Several recent changes in operating personnel were recently announced by the Hudson Coal Co. Edward Owens has replaced Edwin Charlton as mine foreman at Olyphant Shaft. Owens was replaced as mine foreman at Grassy Island Shaft by Jack Hodgson. Wilbur Davis was advanced to section foreman in Hodgson's place.

Lindsay M. Kinney has been named general superintendent of all Pend Oreille Mines and Metals and Reeves-MacDonald operations. He succeeds Charles A. R. Lambly who is now assistant manager of mining operations for American Metal Co., Ltd.

Harold L. Beattie has recently been appointed production engineer of coal operations of Elk River Coal and Lumber Co. at Widen, W. Va.

Acting chief of the U. S. Bureau of Mines' mineral industry survey branch in Spokane, Wash., R. N. Roby has resigned to take a position with Frank Eichelberger and Associates, Spokane engineering firm.

Roger F. Cooper, president of Kentucky River Coal Corp., was elected president of the National Council of Coal Lessors at its recent annual membership meeting. Other new officers are, R. D. Campbell, vice-president; J. M. B. Lewis, Jr., secretary; and S. T. Brown, treasurer.

National Gypsum Co. directors have elected president Melvin H. Baker to the new position of chairman of the board and named executive vice-president Louis R. Sanderson to succeed Baker as president. Fred A. Manske was appointed vice-president in charge of operations, and production manager. Wells F. Anderson succeeds him as vice-president in charge of manufacturing.

Harold Pridham, who recently succeeded Armstrong R. Mathews as president of the Davis Coal & Coke Co., was recently appointed president of the Davis-Clinchfield Export Coal Corp.

**George H. Reiter**, vice-president and general sales manager, was recently elected to the newly created office of executive vice-president of Universal Atlas Cement Co.

**James M. Jenkins**, electrical engineer at the Buckhorn mine of Bell and Zoller Coal and Mining Co. has resigned his position and taken up new duties with Reliance Electric & Engineering Co.

**G. A. Engel** has been named purchasing agent of Oliver Iron Mining Co. to succeed the late Oscar W. Cole. A native of Duluth, Minn., Engel joined Oliver in 1916 as a clerk in the auditing department. During World War II he handled all priority work for the purchasing department.

It has been announced that **T. M. Wyatt** has been elected vice-president of the Hutchinson Coal Co.

Directors of Eastern Lead Corp. named **Joseph V. Grismer** president of the company at their recent organization meeting. Grismer succeeds the late Donald A. Callahan, who held the position from the time of incorporation of the company in December, 1949, until his death last October.

The Colorado Land and Survey Office of the Federal Bureau of Land Management has announced the retirement of **Fred J. McNair**, who has held a commission as a mineral surveyor of the Bureau since May 18, 1899.

**E. C. Weichel**, vice-president, The Hudson Coal Co., was elected recently to the Anthracite Board of Conciliation as a representative of the northern field operators. He fills the vacancy caused by the recent death of Edward Griffith.

**Roger V. Pierce**, consulting engineer of Salt Lake City, specializing in mining mechanization and general production problems, recently returned from Mines de Matahambre, Pinar del Rio, Cuba and early in January left for Cerro de Pasco, Peru.

**Russell Harmon** has been named secretary-treasurer of the Princess Elkhorn Sales Co. filling the vacancy left by the retirement of Mrs. James E. Hart. Harmon also became secretary-treasurer of the Princess Elkhorn Coal Co. and the Powellton Coal Co.

The following appointments were recently made at the Fairmont Machinery Co. **Clyde E. Hennen**, purchasing agent of Consolidation Coal Co. (Ky.), Division of Pittsburgh Consolidation Coal Co. was appointed to the position of purchasing agent for the Fairmont firm. **D. L. Rumble**, previously acting purchasing agent, was appointed assistant purchasing agent.

**S. S. Huyett**, superintendent, Empire Zinc Div., The New Jersey Zinc Co., Hanover, N. M., has been transferred to the staff of the general manager of The New Jersey Zinc Co. (of Pa.) at Palmerton, Pa. He will

be succeeded at Hanover by **W. T. Pettijohn** from Austinville, Va., where he was assistant superintendent of Bertha Mineral Div., The New Jersey Zinc Co.

## -Obituaries-

**Arthur E. Bendelari**, former president of the Eagle-Picher Co., and director emeritus of the company since March 1951, died February 10 in Lexington, Ky.

He came to this country from Canada and as a young man participated in mining operations around Joplin, Mo. In 1915 he joined Eagle-Picher and became president of that company in 1928, serving until 1937.

Mr. Bendelari was an organizer of the American Zinc Institute and served as its president for several years. He was a former member of the Lead Industries Association, and was a director of the American Mining Congress until December, 1951.



Arthur E. Bendelari

**Joseph H. Kerrick**, research engineer with the Philadelphia and Reading Coal and Iron Co., died recently at his home. Mr. Kerrick was graduated from Lafayette College in electrical engineering in 1915, and became associated with the Philadelphia and Reading Coal and Iron Co. in 1932. He was a member of numerous engineering societies and the Anthracite Research Advisory Committee of the Pennsylvania State College.

**Benjamin F. Tillson**, 67, authority on mining and related engineering, died at his Montclair, N. J., home on December 4. Born in Norwich, N. Y., Mr. Tillson joined the New Jersey Zinc Co. after graduation from Columbia University in 1907. He served as an assistant mine captain at Franklin, N. J., and later became head of the mining department and then assistant superintendent.

He had served as chairman of the advisory board of both the United States Bureau of Mines and the National Safety Council.

**Stuart W. Norton**, former Salt Lake City resident and well known in western mining circles, was fatally injured in a New Caledonia mining accident. Norton had been on the Pacific island since December 14. He was operations manager for Calmet, a French corporation.

The anthracite industry was shocked and saddened recently by the passing of **George H. Jones**. Mr. Jones was born in Tomhicken, Pa., in 1889. He began his long career in the coal mining industry as a member of the engineering corps of the Philadelphia & Reading Coal & Iron Co. in 1910. At the time of his untimely death Mr. Jones was vice-president and general manager of the Stevens Coal Co. He had been a member of the board of directors of the Anthracite Institute for many years.

**Joseph F. Woodbury**, one of the original organizers of the New Mexico Mining Association, died recently in Silver City, N. M. Born in 1888, Mr. Woodbury attended the Colorado School of Mines and the University of Colorado, from which he received a law degree in 1914.

He served in the New Mexico State Senate from 1925 until 1927. Mr. Woodbury was known throughout the state for his handling of legal matters for mining firms and represented some of the largest in the southwest.

Long active in gold dredging operations in Alaska, **Jerry J. Franki**, 64, a veteran of the Alaskan gold fields and long-time Seattle resident, died in Rochester, N. Y., in February. Born in Kark, Yugoslavia, he came to Seattle shortly after the turn of the century and shortly thereafter went to Alaska and joined the staff of the New York-Alaska Gold Dredging Corp., in its gold operations at Nyak, Alaska, spending his winters in Seattle, Wash. He was active as a member of the Alaska Yukon Pioneers, Cabin No. 1.

**Dr. Otto Carl Schmedeman**, vice-president of Reynolds Mining Corp., died of a brain hemorrhage at a hotel in Mexico City recently, while on a business trip to attend a geology and mining conference in Mexico.

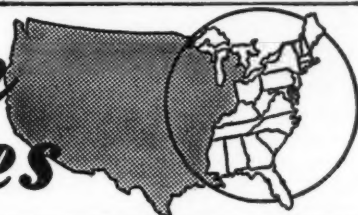
Dr. Schmedeman, born in 1910, served as assistant chief geologist for the Cerro de Pasco Copper Corp. in Oroya, Peru, from 1931 to 1935 and from 1937 to 1941. He spent the two intervening years studying at the Harvard Graduate School of Arts and Sciences. In 1941 he became associated with the Reynolds Metals Co. as a geologist at Sheffield, Ala., and was transferred to Little Rock, Ark., as manager of Reynolds Mining Corp. He became vice-president of that company in 1945, the position he held at the time of his death.

# NEWS

## and VIEWS



### Eastern States



#### Start Training Program

The Jeffrey Manufacturing Co. has inaugurated a Student Training Program so that interested college graduates can be trained for responsible positions with the company. It is open to both college juniors and seniors, the former being given credit for their summer work activity. Men selected will be given a year's training and later assigned to specific divisions to which they are best fitted.

G. B. McNaughton, of the Jeffrey Industrial Engineering Division, has been named Director of Student Training. Arrangements have been made to interview candidates on the campus of the colleges selected.

#### Nicaró Nickel Reopens

Four furnaces of the rehabilitated Government-owned Nicaró nickel plant in Cuba went back into action, 60 days ahead of schedule, on January 31. Each of the four furnaces has a capacity of over 200,000 lb of nickel monthly.

The Nicaró plant was built during World War II to provide nickel oxide. It was closed in 1947, and the present rehabilitation and improvement program started about a year ago. The Nickel Processing Co. is operating the plant under an agreement with General Services Administration. The firm is a joint enterprise of N. V. Billiton Maatschappij of the Hague, Netherlands, and the National Lead Co., with Cuban participation.

The Nicaro Nickel Co. owns and operates the open-pit mines from which the ore is delivered to the water-side plant about ten miles away. The company, a subsidiary of Freeport Sulphur Co., was the wartime operator of the metallurgical plant as well as the mines.

#### Mineral Treasure Chest!

The Newfoundland and Labrador Corp., a combination of Government and business, has been organized to investigate the interior of Labrador. The Government of Newfoundland will hold 90 percent of the shares in the corporation.

Intensive exploration is to start in the spring in an effort to learn the extent of the riches buried in this 110,000 sq-mile triangle of Newfoundland.

Iron Ore Co. of Canada plans to ship the first trainload of a 10,000,000-ton annual production in 1951. Further tremendous reserves are believed to exist and the possibility will be thoroughly investigated.

Explorers also anticipate finding quantities of copper, titanium, lead, zinc, graphite, nickel and mica. First of the spring prospecting parties will concentrate on titanium deposits.

Exploration has shown that Labrador's interior enjoys finer, warmer summers than the Canadian maritime provinces or Newfoundland. In the growing season, the vegetation is lush and permanent settlements can be established.

#### Honor Safe Foremen

Eighty-two foremen of the Red Jacket Coal Corp., Red Jacket, W. Va., were honored at a safety banquet held recently by the coal company. The foremen had supervised their employes for a year or more without a lost time accident. Thirty-four received certificates for one year of safe operation, 19 for two years, 17 for three years, eight for four years, two for five years and two for six years. In addition, Mine No. 17 operated from June, 1950 through July 17, 1951, without a lost time accident and received the trophy for the best accident rate of all Red Jacket mines during 1951.

#### Make Record Shipment

A total of 1,037,703 gross tons of sinter and concentrate was shipped from the Benson plant of the Jones and Laughlin Steel Corp. last year to steel mills in the Pittsburgh, Pa., area. This represents a new record production figure for the Benson development, which is located near Star Lake, N. Y. It was the first time since J & L reactivated the Benson mines in 1942 that a year's shipping total went over the million ton mark. The record was set during a year when there was considerable construction and expansion in progress at the mines and mills.

#### SALES ENGINEER

A mid-western manufacturer of large earth moving and open-pit haulage equipment, with world-wide sales organization, desires several outstanding sales engineers. Opportunity immediately available for men with a minimum of five years experience, qualified to assume complete responsibility for field engineering sales assignments.

In reply please furnish complete resume and indicate salary desired and willingness to relocate and travel. Box 17, in care of this publication.



## 600,000,000 Tons in 1952

Secretary of the Interior Oscar L. Chapman expects coal production to increase in 1952 to about 600,000,000 tons. Production next year of about 555,000,000 tons of bituminous coal and lignite and 45,000,000 tons of anthracite is expected. The increase in production is planned to meet the expanded demands of the defense program and overseas exports.

### Lease Coal Mine

Pittsburgh Consolidation Coal Co. recently announced the completion of two transactions involving the lease and sale of coal mines and reserves in the Freeport field, northeast of Pittsburgh.

One transaction involves the lease to Republic Steel Corp. of Renton Number 6 Mine, located at Newfield, and approximately 3000 acres of metallurgical coal. In operating Renton 6 Mine, Republic will coordinate the raw coal facilities at the mine with its own recently rebuilt coal preparation plant at Russelton, thereby providing itself with a high quality coal for use in steel making.

In the other transaction, National

Steel Corp. and Pittsburgh Consolidation Coal have combined certain acreages in the Freeport field and jointly leased approximately 6000 acres to the newly formed Renton Coal Co. This new company owned 60 percent by Pittsburgh Consolidation Coal and 40 percent by National Steel, has acquired Renton Number 3 Mine, with its plants and equipment, from Pittsburgh Consolidation Coal. The facilities of Renton 3 Mine, which is located at Renton, will be used to mine the jointly leased acreage.

These transactions, it was reported, will permit a more orderly and efficient mining of reserves in the Freeport field and assure a use in keeping with the quality of the coal. Representing additional steps in the coal company's announced intention of making long-term arrangements with its major customers, the actions will meet the increased coal requirements of these growing steel companies with a minimum of new capital investment required.

Officers of the new Renton Coal Co., whose main office will be located at Library, Pa., will be: G. A. Shoemaker, president; G. W. Kratz, vice-president and secretary, and H. K. Yontz, treasurer.

## FOR SALE

**Immediate delivery 1 P&H Model 1400 Electric Stripping Shovel, guaranteed condition. 48 ft. boom, 34 ft. sticks, 3 1/4 yd. bucket, large inventory of parts.**

### HARMON CREEK COAL CORPORATION

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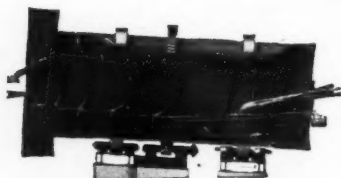
### Bituminous Coal's Milestone

America's bituminous coal industry passed another milestone early in February with the mining of the 26 billionth ton since 1800, according to Dr. Walter L. Slifer, chief of the statistical and research section of the Bituminous Coal Institute.

Great Britain, now in her seventh century of mining, is runner-up to the United States in the all-time production figures, yet her total coal output is less than the 23 billion tons produced by this nation's bituminous mines alone since 1900. Including anthracite, there has been an output of 26,894 billion tons of coal in America in the past 52 years, and a total of 30,953 billion since 1800.

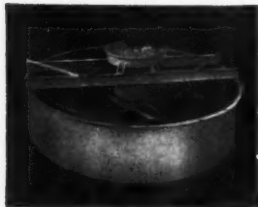
West Virginia was the leading producer of bituminous coal in 1951 with 166 million tons. Next are Pennsylvania, Kentucky, and Illinois in that order. These four states were responsible for more than three-quarters of the 535 million tons of bituminous coal produced in the United States last year.

## CLEANER SANDS—BETTER SEPARATION with Hardinge Classifiers



Counter-Current Classifier

The unique "spiral-squeeze" action of the Hardinge Counter-Current Classifier literally wrings the dirty water and fines from the sands—producing a cleaner, more uniform oversize—nearly dry, if desired. Highly efficient when used in closed circuit wet grinding with a mill, this classifier returns the oversize to the mill for further grinding and discharges a product as fine as minus 200 mesh, if desired.



Hydro-Classifier

The Hardinge Hydro-Classifier is a large-volume classifier for fine separating problems. Combined with the Counter-Current Classifier, it makes an efficient and economical unit, with positive control of the sizing and moisture of both oversize and fines. Separations from 43 mesh to finer than 400 mesh are possible.

State your classification problem, ask for Bulletin 39-B-52.

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### Test U. S. Mining Ability

American ingenuity and engineering ability are presently being tested in the long worked and thin seamed coal mines of Belgium.

Neil Robinson, consulting engineer of Charleston, W. Va., after reporting to the Economic Cooperation Administration that he believed mining costs could be reduced at least 20 percent, and in some cases 35 percent (from \$14 per ton to \$11 and \$9 per ton), was offered a chance to do just that. He was hired by the owner of the Good Hope mine near Liege, Belgium to reduce mining costs. Robinson has been reported as being confident that he would make good on his statement.

Known as the "Robinson Experiment" the situation has attracted the attention of European coal producers. In many quarters it is felt that increased coal production in Europe would help solve many of its economic problems.

## Open New Research Lab

United States Steel Co. has opened a new lab for the study of coal chemicals and coke processes in Pittsburgh's East End district.

The new lab will permit extended study in new uses for coal chemicals and in coking of coal for the steel industry. In coking research, emphasis will be placed on the use of available coals to make metallurgical coke for blast furnace requirements.

About 20,000 sq ft of additional floor space for research work of U. S. Steel's Pittsburgh district scientists and engineers will be made available by the addition of this new laboratory.

## Opportunities for Engineers Great

In a recent address at convocation exercises at Lafayette College, Easton, Pa., Henry C. Woods, vice-president, Sahara Coal Co., Inc., and chairman, Vocational and Education Committee, National Coal Association, stressed the shortage of engineers in the mining industry. The mechanization trend of the past few years, especially in coal mines, has highlighted the need for technically trained men in operation and management.

Coal is no longer classified as a commodity according to Mr. Woods, but is now considered a storehouse of energy. Engineers are needed in all phases of the production and utilization of this vast resource. Coal industry associations stand ready to help financially and with advice the young men who will succeed to the direction of the coal mining industry in the future.

## Build New Plant

Virginia-Carolina Chemical Corp. will construct a new production unit for the manufacture of concentrated superphosphate by the wet-acid process on the company's property near Nichols, Fla. An advanced type contact sulphuric acid plant and wet process phosphoric acid plant there will be provided for by-product uranium extraction and a complete triple superphosphate unit, including granulation equipment.

Phosphate rock requirements for the operation will be supplied from the firm's phosphate rock mines in the area. Virginia-Carolina Chemical owns some 37,000 acres of land in the Florida phosphate field and produces about 1,250,000 tons of rock annually from its Florida mines. It is estimated that the company's reserves are adequate to maintain this rate of production for 20 to 25 years, and use of lower grade reserves will extend this much longer. Plant construction is expected to get under way in the near future.



## Cut Haulage Costs

**W**HEN EDISON Nickel-Iron-Alkaline Storage Batteries power your mine-haulage equipment, they help you cut costs in several ways. Their unequaled dependability gives the closest approach to failure-free, uninterrupted haulage it is possible to obtain. That's because their all-steel cell construction withstands rough usage; their alkaline electrolyte is a preservative of steel; their electrochemical principle of operation is free from self-destructive reactions.

They do not require critical adjustment of charge rates — can often be charged direct from the d-c power supply. They can be fully recharged in six to seven hours, which helps get all charging done during off-peak periods.

Get a current price quotation—you will probably find initial cost lower than you think. Couple this factor with well-known Edison long life and you will have the key to year-after-year economy. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.



YOU CAN ALWAYS RELY ON  
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*Nickel • Iron • Alkaline*  
**STORAGE BATTERIES**

## Incentive Pay for Cobalt

Right Honorable C. D. Howe, Minister of Defense Production for Canada, announced recently that the Canadian government would pay higher prices for cobalt ores and concentrates. Higher prices are being given to maintain incentive for producers in the face of increased costs.

Premium prices paid to cobalt producers would be increased to \$1.20 per lb for ores and concentrates containing from seven to 7.99 percent cobalt. New prices for ores or concentrates with eight to 8.99 percent cobalt will be \$1.50; nine to 9.99 percent cobalt, \$1.80; 10 percent or more, \$2.00.

## Appoint Export Agents

A contract was signed recently between Pennsylvania Coal & Coke Corp. and the Isbrandtsen Co. appointing the shipping company exclusive export agents to leading world ports for the distribution of bituminous coal for metallurgical, locomotive, gas and general steam use. It is estimated that coal shipments for the first year, under this contract, will be more than 2,000,000 tons.

In announcing the new appointment, L. D. Silberstein, president of Pennsylvania Coal & Coke Corp., emphasized the need for coal in many foreign nations. He pointed out that lack of shipping facilities has permitted this shortage to persist, and expressed the hope that similar steps might be taken by other producers.

## Take Elevators to Work

Automatic electrically controlled elevators installed for transporting men at two coal mines in Westmoreland and Allegheny Counties, Pa., were cited recently by the U. S. Bureau of Mines as models of haulage safety. A report released by the Department of the Interior agency says the steel elevators are a commendable improvement over the conventional coal- and man-hoisting cages operating at most mines.

The elevators are at the Lewis Mine of the Pine Run Co., Vandergrift, Westmoreland County, and the Butler Junction Mine of the Butler Junction Coal Co., near Freeport.

The cars stop automatically at landings. They cannot be overwound. Overspeed controls are provided. Passengers cannot fall from cars and operation can be either automatic or semi-automatic. Doors cannot be opened accidentally while the car is in motion. If they are forced open, the car automatically stops.

For a free copy of the report, Information Circular 7628—Write: Publications-Distribution Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.



## New Storage System

The first storage system of its kind in the phosphate industry was installed recently by American Cyanamid Co. at its plant in Brewster, Fla. Introduction of the new system, which includes a rotary stacker conveyor and underground tunnels for blending, brings added storage capacity, more accurate blending and more efficient operation of the storage facilities and of the mines themselves.

Directly under the different grades of rock in the storage pile are evenly-spaced openings into a continuous underground tunnel of reinforced concrete. These openings are controlled by electrically operated gates through which rock may be deposited on conveyor belts. Grades of rock are blended by proportioning the desired grades through these gates.

At about the mid point of the tunnel, two transfer conveyors carry the rock out of the tunnel to a dual conveyor system entering the dry plant. The tunnel conveyor can feed either or both of the transfer belts and the transfer belts, in turn, can feed either or both of the dry plant's conveyors. This permits rock to be removed at any controlled rate from any point in the pile, or from several points at once, resulting in continuous dependable operation and accurate blending.

Engineering, specifications, and design were handled by Cyanamid's Central Engineering Division. The stacker was designed and supplied by Jeffrey Manufacturing Co., and all construction work was done by the local plant construction organization.

## BARGAINS IN USED AND REBUILT EQUIPMENT

### LOCOMOTIVES, 250 VOLT DC, BALLBEARING

- 2—20-ton Jeffrey MH-77
  - 2—15-ton West. 908-C
  - 2—15-ton Goodman 36-A
  - 5—15-ton Jeffrey MH-110
  - 4—13-ton G.E. HM-827
  - 2—13-ton Jeffrey MH-110
  - 1—10-ton Jeffrey MH-110
  - 4—10-ton Goodman 34-B
  - 12—8-ton Jeffrey MH-100 with reels
  - 3—8-ton G.E. HM-819 with reels
  - 4—8-ton West. 905-C with reels
  - 4—8-ton G.E. HM-83 with reels
  - 15—6-ton Jeffrey MH-88 with reels
  - 4—6-ton G.E. HM-801 with reels
  - 15—6-ton G.E. Battery Locomotives
  - 5—6-ton Wancha Battery Locomotives
- Complete with new Jeffrey steel strip resistances. All have been rebuilt and any part showing any wear was replaced with new.

### LOADING MACHINES, 250 VOLT DC

- 6—14-BU-3PE Joy
- 4—14-BU-7RBE Joy
- 6—11-BU Joy
- 6—8-BU Joy
- 10—7-BU Joy
- 5—460 Goodman
- 2—360 Goodman
- 4—260 Goodman
- 5—1-600 Jeffrey
- 2—1-500 Jeffrey

### CABLE REEL SHUTTLE CARS, 250 V DC, ALL TYPES

### MOTOR GENERATOR SETS, 275 V, 1200 RPM, 2300/4000 V

- 1—300 KW West., full automatic switchgear
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All complete with switchboards, transformers, and all necessary appurtenances.

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Several lots of Rotary Dump, End Dump, and Drop Bottom Mine Cars for high and low vein mines. Mail us your inquiries. We have them in lots from 100 to 600, track gauge—36", 42", 44".

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- 8—Sullivan 7-B on Joy cats
- 6—Goodman 512 on Joy cats
- 12—Goodman 112-AA
- 15—Goodman 112-AA

### AC CUTTING MACHINES—220/440 VOLT

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- 1—Jeffrey 24-B
- 3—Jeffrey 35-BB
- 1—Jeffrey 35-L
- 5—Goodman 1263
- 5—Goodman 11263
- 4—Goodman 11263A
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Several 4-, 5-, and 6-track late type steel Tipples; also Link-Belt, McNally-Norton, and Heavy Media Coal Washers with capacities of 200 and 300 tons per hour; and two McNally-Norton Unit Washers of 100 tons per hour capacity.

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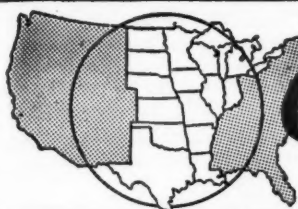
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# Central States

## Zinc Institute to Meet

The 34th Annual Meeting of the American Zinc Institute will be held April 21 and 22 at the Hotel Statler in St. Louis, Mo.

Present plans provide for a full two-day program with a morning and afternoon session scheduled for both Monday and Tuesday.

Speakers from Government and industry will report on the general outlook for metals; the zinc supply and requirement picture. Mine development and production expansion at home and abroad will be thoroughly covered by a special panel of mining men. Plans are under way to add several special features to the program on topics of vital interest.

## Michigan Uranium Hopes Up

Hopes of producing uranium in commercial quantities in the Upper Peninsula of Michigan have been revived on the Marquette range. Announcement of the discovery of significant uranium mineralization followed closely a decision late in December to abandon exploration in another part of the peninsula. The Jones and Laughlin Steel Co., has announced that the material is higher in uranium content than any previously discovered in the region. The uranium was found in an iron formation for the first time. Samples were taken from abandoned iron mine dumps near Champion, Mich., and checked chemically by the Atomic Energy Commission. The tests showed that the radioactivity came from the iron.

Because the old mine workings are inaccessible, little is known of the location of the uranium in the iron formation. Although there is no indication of the extent of the strike, the samples are good enough to encourage further exploration.

Previously, the Jones & Laughlin Ore Co., a subsidiary of the steel company, had relinquished an 18-month old lease on 80-state-owned acres in Baraga County, 18 miles northeast of L'Anse, where traces of uranium had been found earlier. However, they failed to prove commercial on being studied in detail.

## Announce Bauxite Shipments

Reynolds Metals Co. will begin shipments of bauxite from the firm's bauxite deposits in Jamaica, B. W. I., to its Hurricane Creek plant, Little Rock, Ark., in September or October this year. Actual date of shipments will depend upon the speed with which a self unloading ore ship can be completed and delivered.

## Set Safety Record

Not so many years ago a record of 1,000,000 continuous man-hours without a lost-time injury was considered exceptional. Now, however, the Mahoning and Embarrass Mines operated by Pickands Mather and Co. have broken this mark with two new top records for open pit mines and quarries. The Mahoning mine, employing 274 men, worked 2,975,477 man-hours from January 20, 1948, to October 30, 1951, for the best record known to the National Safety Council.

The Embarrass Mine, employing 335 men, holds the second best record by working 1,931,421 injury free man-hours from April 29, 1948 to February 28, 1951. A third mine, the Sagamore Mine, employing 106 men, has worked since June 20, 1944, to the present time without a lost time injury, accumulating 1,513,929 injury free man-hours. This is a 6½ years period without a lost time injury.

## To Build Nickel Refinery

Sherritt-Gordon Mines, Ltd. has announced that it will build a nickel refinery near Edmonton, Alberta, Canada. The refinery will handle ores from the company's new operations at Lynn Lake, in Northern Manitoba.

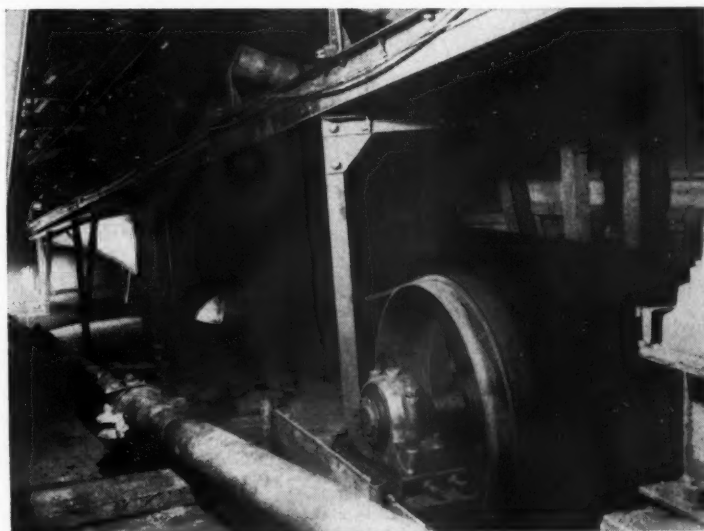
## Convey Iron Ore Despite Weather

HERE'S what puts the twist in the new "turnover" belt conveyor system. Return strand of belt, at bottom, moves from right to left with carrying surface of the belt being brought uppermost at extreme left. The 180° twist of this 36-in. belt is made in a 36-ft distance.

The "turnover" feature, developed jointly by The B. F. Goodrich Co. and

the Chain Belt Co., makes it possible, for the first time, to move iron ore out of underground mines and into surface stockpiles on rubber conveyor belts in freezing weather.

The "turnover" belt system is now being operated in iron ore mines located near Ishpeming, Mich. This photograph was taken at an underground installation of the system.



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## Library for Drill Cores

More than 37,500 ft of drill cores from mining projects in four upper midwest States have been stored in the core storage library of the U. S. Bureau of Mines, just south of Minneapolis, Minn., since its opening about a year ago.

Only Federal depository of its kind serving the minerals industry of the area, this unique library offers industry and Government a free place to store and examine core from mineral exploration projects. Industry in all sections of the country is invited to use its facilities.

Of the 37,628 ft of drill core stored to date 9518 ft came from Minnesota, 7402 ft from Wisconsin, 12,986 from Michigan, and 7722 ft from South Dakota's Black Hills.

Minnesota core represents iron ore exploration by the Great Northern Iron Ore Co., and Bureau of Mines drilling on iron sulfide deposits near Aitkin and on manganese-bearing iron ore deposits on the Cuyuna Range. Core from Wisconsin is the result of Bureau of Mines drilling for lead-zinc ore near Platteville, and for zircon near Wausau.

Michigan core represents iron ore

drilling by The M. A. Hanna Co., and South Dakota core—Bureau of Mines drilling for pegmatite containing mica, beryl and feldspar on about 10 properties in the Black Hills.

To use the library, write or telephone the Chief of the Mining Division, Region V, Bureau of Mines, Department of the Interior, 2908 Colfax Avenue South, Minneapolis 8,

## New American Zinc Lab

The American Zinc, Lead & Smelting Co. has announced the completion of a new research laboratory located at 10334 Manchester Road in Kirkwood, Mo. Research work to be done at this laboratory will supplement the company's present research program. The new research laboratory will be devoted exclusively to new products development.

Dr. H. A. Depew, who has been connected with American Zinc in various research capacities since 1931, will direct the new project in the position of director of the St. Louis Research Division. Dr. Depew's headquarters will be located in the new laboratory.

Scope of the laboratory activities will be broadened to include research on new products now under way and

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other new uses for various products produced by American Zinc. Basic development work and process development work and improvements will be handled by the individual plants and by the company's Metallurgical Department, as at present. Research and development in zinc pigments will be continued by the American Zinc Sales Co. at Columbus, Ohio.

## Mine Changes Hands

Skoubie Bros. Co., Virginia, Minn. contractors, has purchased the Virginia open pit iron mine located near Eveleth on the Mesabi Iron Range. The mine was operated by the Schneider Mining Co. until the close of the 1951 shipping season.

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### Iron Leases Approved

Two iron ore leases on the Cuyuna Range of Zontelli Brothers, Ironton, Minn., were approved on two undeveloped properties north of Crosby, Minn. An amendment to two existing leases to the Leonidas Mine at Eveleth, held by Oliver Mining Co., was also approved by the Minnesota State Executive Council. The change would permit the holder to reactivate property that has not been worked since 1913 and which has an estimated 6,700,000 ton reserve on the Mesabi range, half underground and half open pit ore.

### Taconite By 1955

Republic Steel Corp. and Armco Steel Corp., have jointly acquired the 15 percent interest in Reserve Mining Co. formerly held by National Steel Corp. This sale gives Republic and Armco each a 50 percent ownership of Reserve.

Reserve Mining has started construction of the main plant at Beaver Bay, Minn., which will be producing high grade iron ore pellets in 1955.

A smaller taconite processing plant is now being built by Reserve at Babbitt, Minn., and will go into operation early this year. The iron ore will be produced in the form of hard, walnut-sized pellets and will be of much higher grade than any ores now being mined in the Lake Superior region.

### Will Increase Zinc Supply

Quick Seven Mine near Neck City, Mo. is being readied for production to increase domestic slab zinc production about 5500 tons per year. Brown and Root, Inc., who have controlled the property for some time, and American Zinc, Lead and Smelting Co. are entering the venture jointly.

The project includes construction of a concentration mill with a 2000-ton daily capacity. It is estimated that

the properties will be in full production during the second quarter of 1952.

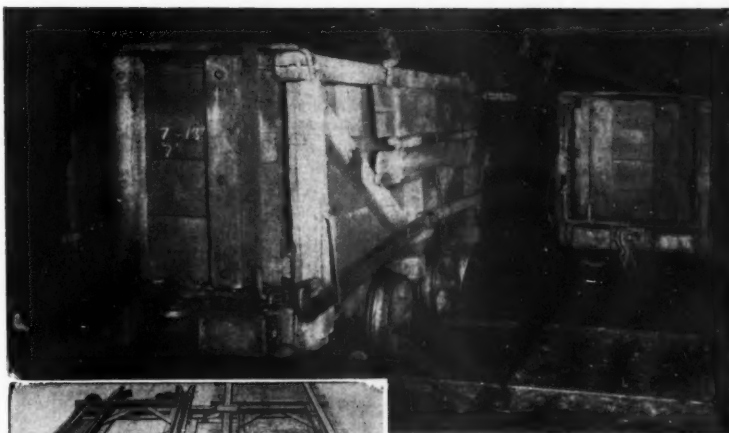
### Acquire Clay Products Co.

International Minerals & Chemical Corp. recently acquired all of the outstanding capital stock of Eastern Clay Products, Inc., and simultaneously created a new Industrial Minerals Division, into which that company will be absorbed. International now has five product divisions, namely, phosphate, plant food, potash, amino products and industrial minerals.

Eastern Clay Products produces swelling bentonites, used as drilling muds in oil fields, and other grades of bentonites and clays which are used in foundries and other industrial applications. The bentonites are mined and processed from deposits owned or leased in South Dakota, Wyoming, Montana and Mississippi. Refractory specialties and bonding clays are produced in Ohio. Essentially the company's operations consist of open pit mining of ore, followed by storing, crushing, drying, pulverizing, and bagging of the product. Clay and bentonite plants are operated at Belle Fourche, S. D., Smithville, Miss., and Bondclay and Lawco, Ohio. A refractories plant is operated at Jackson, Ohio.

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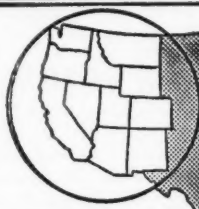
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# Western States

## Acquire Uranium Claims

American Smelting and Refining Co. has acquired 44 claims in the Marysville, Utah mining district of Piute and Sanpete Counties in a 50-year lease from Marysville Uranium Co. This is AS&R's first commitment on uranium ore exploration in Utah. Edward W. Coyle, secretary-treasurer and attorney for the firm at Salt Lake City said that AS&R has agreed to commence certain minimum work on the claims by July 1. After that date, additional work must be performed if the claims are to be retained.

The claims are about one and one-half miles east of present workings of the Vanadium Corp of America and Bullion-Monarch Mining Co. from which uranium has been produced. An AS&R spokesman from the exploration department said the claims were largely unproved and that a geological study of them would be conducted this summer.

## To Develop Linka Mine

The C. and C. Tungsten Co. has announced plans for the development of the Linka tungsten mine in Lander County, Nev. The company's development plans await establishment of a

government stockpile or erection of a custom mill at Austin, Nev., or in Smokey Valley, officials said. The Linka mine operated in World War II, shipping more than 2600 tons. Jay A. Carpenter, former dean of the Nevada School of Mines, is president of the firm.

## Colorado Mining Association Meets

Mining men gathered in Denver January 31, February 1 and 2 to attend the 55th annual convention of the Colorado Mining Association and affiliated groups. Blair Burwell, president of the Association, opened the meeting with a discussion of uranium and tungsten and the ability of this country to produce them. He said we must get away from the "feast or famine" status which has prevailed too long.

Robert S. Palmer, manager of the Association, presented his annual report to the members. He stressed the important role the organization played during the past year and pointed out how its objectives were being realized. At the Thursday morning session, presided over by Oscar H. Johnson, president, Idarado Mining Co., stream clarification and the rights of the miner also came in for thorough discussion.

The luncheon on opening day was well attended. With Hon. V. A. Cheever presiding, Simon D. Strauss, vice president, American Smelting & Refining Co., deplored unqualified official predictions of permanent metal shortages. He outlined a number of factors that might well ease the supply situation before 1954.

The small miners' contribution to the nation's well-being was reviewed on Thursday afternoon by a panel of metal mining men from Colorado, California, Nevada, and South Dakota. On the same afternoon there were papers on suggested improvements for handling uranium by Norman D. Ebbley, Skidmore Mining Co., and one on Trona in Sweetwater County, Wyo., by C. A. Romano, Intermountain Chemical Co. The Leadville Drainage Tunnel was the subject of a discussion led by E. D. Dickerman, vice president, Colorado Mining Association. Contributions to this session came from J. H. East, Jr., H. F. Greshuk, Ed Matsen, W. H. King, M. H. Salisbury and Homer Stewart.

Oil shale, its mining and processing, was the topic under discussion at a special evening session led by D. D. Potter, Federal Oil Shale Co. At this session the Hon. Robert R. Rose, Jr., Assistant Secretary of the Interior; Dr. Wilbur C. Schroeder, Chief, Synthetic Liquid Fuels Div., USBM; J. W. Foley of the Texas Company, and oil shale authorities of the USBM Boyd Guthrie, H. M. Thorne and H. P. Rue filled out a well-rounded program.

Felix E. Wormser in his address, "The Lead Miner Under Government Controls," blamed shortages of zinc and lead on government price fixing. He pointed out the futility of imposing price controls on a commodity like lead under present international conditions. He suggested that, if the prices on zinc and lead were decontrolled, shortages would disappear.

Other contributions to this session, presided over by George O. Argall, Jr., editor, *Mining World*, and Mike Cloonan, were delivered by C. O. Anderson, Ozark Mining Co.; W. H. Goodrich, Kennecott Copper Corp.; Andrew R. Sims, Anaconda Copper Mining Co.; Percy S. Gardner, Calumet & Hecla Consolidated Copper Co.; R. W. Whitney, M. A. Hanna Co.; and Clark L. Wilson, New Park Mining Co.

With E. H. Snyder, Combined Metals Reduction Co., presiding on Friday afternoon, government programs to aid mining came in for a thorough airing. Ernest V. Gent, American Zinc Institute; Glen McLaughlin, Expansion Division, DPA; Hon. Robert R. Rose, Assistant Secretary of the Interior; Jess Larson, DMPA Administrator; Howard I. Young, Deputy Administrator, and Otto Kline, GSA, all addressed the meeting. Their talks were the subject of observations from O. W. Bilharz, Joseph H. Taylor, Elmer Isern, Robert L. Jones and Burt Brewster.

Research developments and recent advances in mineral dressing were the topics covered by James Bean, of American Cyanamid Co., and V. L. Mattson, of the Colorado School of Mines. Harold S. Worcester, King Lease, Inc., presided. Sherwin F. Kelly, Geophysical Services, Inc., spoke on the role of geophysics in mineral production.

On Saturday morning Ray G. Sullivan, Minerals Engineering Co., presided at the uranium section. Here problems of the uranium industry from exploration to milling were reviewed by such speakers as Frank H. MacPherson, Thomas W. Oster, Harold K. Stager, Walter E. Remmers, D. W. Viles, J. B. Knaebel and Cato Sells.

In the afternoon, with Dr. A. H. Koschman, USGS, in the chair, applications of geology and geophysics in several mining districts were reported by members of the USGS and others. Later J. P. Bradley, Bradley Mining Co., presided at a meeting where Blair

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Burwell presented a paper on treatment of tungsten ores and W. H. Marquette spoke on beneficiation of sulphur ores in Wyoming. Robert S. Palmer presided at a brief session devoted to Mining Taxation, and Otto Herres, Combined Metals Reduction Co., summed up the metal situation.

At the beautiful Gold and Silver Banquet Frank A. Wardlaw, International Smelting & Refining Co., was toastmaster. Among the after-dinner speakers were Mrs. Viola MacMillan, president, Prospectors and Developers Association, from Canada. She presented an up-to-date account of mining activities north of the border.

Ken Regan, chairman of the U. S. House of Representatives Committee on Mines and Mining, pinch hit for Senator O'Mahoney of Wyoming, when the Senator's wife's illness forced him to cancel his trip to the meeting. Howard R. Huston, American Cyanamid Co., was the third featured speaker, his text being "The Test of Americanism."

A capacity crowd of mining men enjoyed the famous Sowbelly Dinner on Saturday night. John W. Valentine, assisted by James C. Colasanti, was toastmaster. Among the featured speakers were Mayor Quigg Newton of Denver and Colorado's Governor Dan Thornton, Henry H. Fowler, administrator, NPA, and Fielding Smith.

U. S. Senator Homer E. Capehart, Indiana, was cheered when he declared for a return to the gold standard and more aid for American mining.

Ken Regan advocated that the mining industry present a united front, decide what is wanted and then see that something is done about it.

Safety awards for accident prevention were presented by Chairman R. H. Brannaman to American Smelting & Refining Co. of Leadville and Crestone, and to H. M. Williamson & Sons, Boulder, Colo.

### Golden Crown Sinks Shaft

The Golden Crown Mining Co. is sinking a 450-ft shaft, known as the Brown Shaft, on a group of four claims in the Big Bug district of Yavapai County, Ariz. The company's exploration program is directed by Arthur R. Still of Southwestern Geological Service, Prescott, Ariz. R. M. King, Humboldt, Ariz., is mine superintendent.

### Taylor-Knapp Manganese Mill

Taylor-Knapp Manganese Mining Co., is operating its new concentration plant three miles south of Tracy, Calif., on ore from the Ladd mine. The mill is fully equipped and is treating about 100 tons of ore daily. Manganese is recovered by magnetic methods of concentration, but the mill has been designed for use of both dry and wet milling processes.



## It's Denver in '52

ON September 22-25 mining executives, engineers and operating men from all parts of the country will gather in Denver, Colo. for the American Mining Congress Metal and Nonmetallic Mineral Mining Convention and Exposition. Already so many leading manufacturers have booked space for exhibits of mining equipment that it can be confidently predicted this will be the biggest such convention and exposition ever—at least one third bigger than the Salt Lake City exposition in 1950.

Every kind of mining and milling machinery, equipment and supplies will be seen in operation inside the enlarged auditorium. Outside, it has been necessary to take over two large parking lots to accommodate the exhibits of earth moving machinery too big to go into the auditorium. Improved models of all the standard types of equipment will be on view and production units embodying many entirely new ideas will be presented for the first time.

The Exposition will present an unparalleled opportunity to see, examine and discuss at first hand all of this equipment and its suitability to various operating conditions. The program for the Convention will include operating papers describing successful applications of many of these units as well as papers on general economic and governmental matters of import to the entire mining industry. The program committee will meet early this summer to sift hundreds of suggestions from thoughtful mining men in every part of the country.

The resulting schedule of events will be of inestimable value to the mining industry. Every executive and operating man who can possibly do so should make this Convention and Exposition a must in his schedule for 1952.

Denver's accommodations will be taxed to their utmost capacity so it is advisable to make reservations early. Write, wire or telephone the Denver Convention and Visitors Bureau, 225 West Colfax Ave., Denver, Colo.

Ore is mined by open cut methods from deposits containing oxidized ore. Mine output is trucked nine miles to the plant. The company may mill high grade manganese from nearby properties on a custom basis later.

Taylor-Knapp Manganese Mining Co. is a subsidiary of Taylor-Knapp Co., operating manganese properties and a plant near Philipsburg, Mont. The corporation is a major producer of battery grade manganese.

## Develop Oregon Black Sand

New mining activities are being launched on the black sand beach near Bandon, Ore. The Coast Minerals Co., Ltd., has inaugurated strip mining and milling operations on its property there. Owners of property at Whiskey Run Beach, just north of Coast Minerals', have engaged D. B. Cooke to engage in a research project on their beach property. Cooke has spent much time during the past few summers experimenting with separation processes in the area north of Bandon.

## Establish Ore Buying Station

The United States Atomic Energy Commission has established a purchasing station for uranium-bearing ores on the Navajo Indian Reservation at Shiprock, N. M. The Shiprock depot started receiving ores on January 7, 1952.

The depot was established primarily to receive uranium-vanadium bearing ores from northeastern Arizona. Most of the ore in this region comes from the Navajo Indian Reservation.

Ores meeting specifications of U. S. AEC Domestic Uranium Program, Circular 5, Revised, will be purchased under the provisions of the circular.

Certain ores containing over 6 percent lime will also be purchased at Shiprock but only under special agreements with each producer.

The Shiprock depot will be operated for the AEC by the American Smelting and Refining Co. which also operates ore purchasing stations at Monticello and Marysville, Utah.

Limestone-gangue uranium-bearing ores, all of which contain more than 16 percent  $\text{CaCO}_3$ , are not amenable to the process contemplated for processing Reservation ores. Therefore, limestone-gangue uranium-bearing ores will not be accepted at the Shiprock ore purchasing depot. Arrangements are being made to provide a market near Grants, N. M. for ore of this type.

## Deepen Whitelidelf Shaft

Contract has been awarded to Anderson & Sons for sinking the Whitelidelf Mining and Development Co. shaft at Clark Fork, Idaho, from the 400 to 800-ft level, C. I. White, managing director has announced. The work is being financed by a recently announced exploration loan from DMEA. The property has silver-lead ore disclosed by diamond drilling several years ago by the Bureau of Mines.

## Open Barite Deposit

Stripping of the overburden at a barite deposit, 20 miles south of Aguila, Ariz., has been started by the Arizona Barite Co. The new property is to be developed as an open-pit operation. Arizona Barite is mining and milling about 2500 tons of barite monthly at its underground mine, east of Mesa, and employs 18 men on a three-shift basis. William F. Paine of Mesa is manager.

## Develop Phosphate Deposit

Griff Williams, Sheridan, Wyo., reports that the Williams Phosphate Corp. has taken over the Mountain Meadow phosphate deposit on Ruby River, near Alder, Mont. A drift was run 200 ft on the hanging wall of the vein. It will be extended to 1000 ft with crosscuts every 100 ft. He expects to install a primary crusher and ore bin. Output will be stored for the present.

## Sell Fluorspar Mine

H. W. Gould & Co., San Francisco mining firm, has sold its Baxter Fluorspar Mine located near Fallon, Nev., according to Bruce A. Gould, president of the company. Purchaser was the Kaiser Aluminum and Chemical Corp. Product of the mine will be used in Kaiser's large aluminum expansion program. The Gould company has been developing the property since late 1950 when the property was acquired. A purchase contract in the amount of \$7,000,000 for acid grade concentrate for government stockpile recently secured by Gould will be cancelled. An outright cash sale of the property was made. The Gould company is carrying on an extensive exploration program for fluorspar properties.

## Reopen Manganese Mine

The King Manganese Corp. of Houston, Texas has started work on the Blackbird properties of Kane County, Utah, where they plan to mine manganese ore by open-pit mining methods. Plans also call for a simple beneficiation plant to separate manganese ore nodules from the clays and shales in which they are found. Operators are at present completing camp construction and stripping the mineralized zone.

It is planned to beneficiate approximately 200 tons per day. Officials of the company report a contract to deliver a substantial tonnage of material to the U. S. Government, utilizing railheads at Marysville and Cedar City. The property was operated during World War II by Snyder Mines Co. and furnished ore to the government.

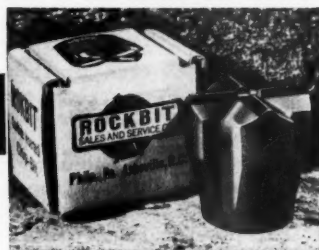
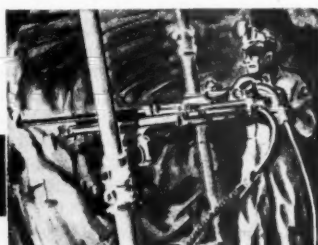
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## Stockpile Sulphur

Over 100 tons of sulphur are now stockpiled at the Wyoming Gulf Sulphur Corp.'s pilot plant west of Cody, Wyo. The sulphur is accumulating at the rate of 12 tons a day. It is to be melted and put into cakes for shipment by April. W. H. Marquette, company president, has announced a 42-foot extension of the plant to house additional milling equipment.

## Shattuck-Denn Progresses

The Shattuck-Denn Mining Co., Humboldt, Ariz., is planning to deepen the shaft at its Iron King mine to the 2000-ft level. In 1951, the Iron King was the state's leading producer of zinc, and ranked second among lead producers.

The exploration program at Shattuck-Denn's Kay copper mine, in the Tip Top mining district is being continued. Both crosscutting and diamond drilling are in progress there. H. F. Mills, general manager of the corporation's Iron King Division, is directing the work at both properties.

## Open Alaskan Tin Mine

Construction of a small concentrator at Lost River tin mine in Alaska has been made possible by a Government purchase contract. The U. S. Tin Corp. is constructing a concentrator and preparing the Lost River Mine for operation.

## Chromite-Manganese Mill

A 350-ton mill, to handle both chromite and manganese, is being constructed near Medford, Ore., and will be operating shortly. Lester L. Sibley of Medford is the managing engineer. Chromite ore will come from the Sordy chromite mine near Galice, Ore. The mill is expected to accept custom ore from several small producers.

## Ore Bonuses Hit \$250,000

More than \$250,000 was paid out last year to uranium ore producers under the new incentive bonus program of the Atomic Energy Commission.

The graduated bonus arrangement (based on uranium oxide content of the ore) was established in June in Domestic Uranium Program Circular 6 and was retroactive to March 1, 1951. It was one of several steps taken by the AEC to stimulate domestic production of uranium. Approximately one-third of the 70 mines which have been certified for bonus payments had no production prior to March 1, 1951.

This bonus should not be confused

with the \$10,000 premium announced in 1948 for discovery and production of high-grade uranium ores from new domestic deposits. No one has qualified for this earlier bonus.

## Grey Eagle Work Set

Construction of mine and camp buildings has been completed at the Grey Eagle lead-silver-zinc property in the Tenabo district near Beowawe, Nev. A pressure water system and electric lighting plant have also been provided. Driving of No. 6 tunnel will be continued to contact orebodies 400 ft below upper levels. The lateral will be 2000 ft long when it contacts the main ore zone, and will be the main working outlet. The Grey Eagle is controlled and operated by Grey Eagle Development Co. Old workings have been connected with a new 225-ft drift, and mining machinery installed.

## C. F. & I. Co. Opening New Property

Colorado Fuel and Iron Co. is opening up a new mine near Stonewall, Colo. Now under construction, the new mine will be served by two 3000-ft slopes. The mine is expected to produce 10,000 tons daily from a six-ft seam of high-grade coking coal when in full operation. Haulage in the slopes will be by belt conveyor. A shaft is being sunk to provide access for men and supplies.

A 9.5-mile railroad is under construction from Weston, Colo., to the mine site. More than 960,000 cu yd of material will have to be moved and cuts and fills up to 54 ft deep and 1000 ft long will be required along the right-of-way.

## To Expand Cobalt Mill

Calera Mining Co., subsidiary of Howe Sound, will soon be producing at the rate of more than 1500 tons of cobalt metal a year. The company is increasing the capacity of its new cobalt concentrator by 60 percent to treat ore from the Blackbird mine at Cobalt, Idaho. The mill has been running on a tuneup basis since September. Production at the mine will be increased to 1000 tons daily as soon as the cobalt refinery at Garfield, Utah, is finished. Concentrates are trucked to nearby Challis, Idaho, and then to Mackay, closest railpoint, whence it is shipped to Garfield.

Two deposits, the Brown Bear and Chicago, have been developed with mining widths averaging 15 ft. Walls in both cases are poorly defined and require close assay supervision. Levels have been established at 100-ft intervals from the 6850- to the 7400-ft level and a new 7000-ft level is being established.

## Develop McGill Iron Deposit

Reports are that the McGill iron deposit near Redding, Calif., may be developed for production soon. The property produced high-grade iron ore for a small electric smelter operation some 35 years ago. The smelter was operated by the Noble Electric Steel Co. at Heroult. The property was again operated on a fairly substantial basis during World War II.

## AEC and Anaconda Sign Pact

The U. S. Atomic Energy Commission has signed a contract with the Anaconda Copper Mining Co. under which the AEC will purchase the uranium production of an ore processing plant which Anaconda will build near Grants, N. M. The plant is expected to be ready for operation early in 1953.

Under the terms of the contract, Anaconda will build and operate the processing plant and auxiliary facilities, all of which will be company owned. The Commission has agreed to purchase the U<sub>3</sub>O<sub>8</sub> production of the plant for a five year period.

Anaconda will start construction work immediately and the plant is expected to be placed in operation about April, 1953. Arrangements are being made to provide a market at the plant site for uranium-bearing ores produced by other operators in the area.

## Reopen Philippine Mine

Itogan Mining Co., third largest gold mine in the Philippine Islands, reopened in December under the management of Marsman and Co. The mine was almost totally destroyed during the occupation.

## Filtrol Adds to Salt Lake Plant

The Salt Lake City plant of the Filtrol Corp. now represents an investment of nearly \$4,000,000 with the recent addition of a \$50,000 flotation unit for the extraction of iron pyrites from halloysite clays used by the firm in processing the catalysts which it supplies to the oil refining industry. The unit, designed and built by Galigher Co., will increase the area's reserves of halloysite clays by removing the disulphides and providing usable amounts of this mineral.

While Filtrol obtains its main supply of clay from the Dragon Consolidated Mines Co., at Eureka, Utah, many of the lead-silver-zinc mines in the region have showings of halloysite which would be usable after processing. The iron concentrates from the mill are stockpiled for later sale while the clays are used immediately in processing operations.

## Develop New Wagon Drill

Utah Uranium Co.'s engineering department, with the aid of Sharp Engineering Co., Salt Lake City, has developed a unique wagon drill for exploration in Emery County, Utah.

It is hoped the new unit will drill 200-ft holes. Air driven and mounted on an Army surplus truck, an extended tower permits the use and exchange of 18-ft drill steels, 1½ in. diam. Utah Uranium plans to build six such wagons for use with special Geiger counter and other probing equipment.

## Sample Wyoming Uranium

The Canary Mining Co. has opened up a uranium deposit 70 miles south-east of Rock Springs, Wyo. According to Floyd Bailey, president of Canary Mining, nine men are employed on the project, opening a slope and a drift to mine samples.

## Race Underground Coal Fire

Paul Hunt Construction Co. of Steamboat Springs, Colo. excavated a 60,000-cu yd trench to isolate the Skull Creek coal fire near Craig, Colo. The job also involved placement and compaction of 30,000 cu yd of non-flammable material in the trench. Raging 80 ft underground, the fire

will be blocked by the trench shown under construction. Coal is dozed far beyond the course of the fire which is predetermined by test bore-holes and surveys. An estimated 2,500,000 tons of coal will be saved by this project.

## Lease Mining Claims

American Smelting and Refining Co. and Day Mines, Inc., are jointly taking a 60-year lease on the Sterling group of 12 unpatented mining claims in the silver belt just west of Wallace, Idaho. The Sterling group is sandwiched between the Vulcan and Fern groups with the Fern on the south and Vulcan on the north. The Day company owns the Fern, which is undeveloped, and is owner of a one-quarter interest in the lease and profit sharing agreement on the Vulcan, on which the two companies have completed a shaft to the 3000-ft level and have developed a commercial, low-grade silver lead ore body by drifting and diamond drilling.

## Mid-Continent Expands

The Mid-Continent Mining Co. of Elizabethtown, Ill., has acquired the Lone Star fluorspar property, near Benson, Ariz. About 400 tons of fluorspar ore are being shipped monthly. The entire output comes from stoping operations on the 250-ft level.

## Drill Asbestos Deposit

Diamond drilling is progressing at the Stark asbestos deposit in Washington, Calif. Surface trenching tests started last May indicated important deposits and more than 4000 ft of drilling is being carried on to outline the ore body.

## Ore From Iron Mountain

E. G. Smith, Osburn, Idaho, who formerly operated the Nancy Lee mine under lease, is reported shipping ore to the Nancy Lee custom mill from the old Iron Mountain mine. Both properties are in the Superior, Mont. area.

## Relocate AEC Office

A branch Exploration Office of the Division of Raw Materials of the Atomic Energy Commission opened in Salt Lake City, Utah recently. The Commission's exploration office in Spokane, Wash. was closed after the Salt Lake Office opened. Ernest E. Thurlow will head the new office. It will be his function to expedite exploration for uranium in eight western states outside the Colorado Plateau. This is a much wider area than that served by the Spokane office. Western headquarters for the Exploration Branch is in Grand Junction, Colo.

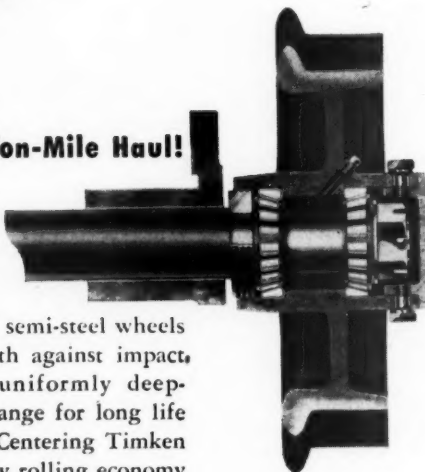
## Lease Elk Group

Federal Mining Co. and Day Mines, Inc., have leased the Elk group, near Mullan, Idaho, consisting of three mining claims, for a period of 30 years with an option to renew for another 30 years. Terms of the agreement provide that the leasers pay the Premier Star Mining Co., owner of the Elk group, 35 percent of the value of all ore produced from the ground in question. The Elk claim proper lies south and west of the You Like vein and is believed to contain a faulted segment of that vein. The new development will probably be a crosscut or diamond drill hole. From the present drift Federal is driving into Independence ground from the 3600-ft level in the Morning mine. This heading has now been advanced considerably over 1500 ft and will intersect the Elk claim at a depth of 2400 ft.

The Elk is an early-day location and was owned by the late Joseph Carson, mine superintendent for Larson & Greenough, who were then owners of the Morning and You Like mines. The Carson estate sold the property to John R. Moore, of Seattle, who has since developed some ore in a lower tunnel. W. E. Cullen, Jr., one of the owners in Independence Lead, is secretary of the Premier Star Co.

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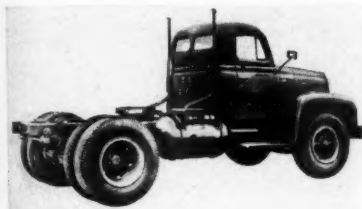


# Manufacturers Forum

## Market Propane-Butane Fueled Trucks

The motor truck division of International Harvester Co. has introduced factory-built liquefied-petroleum-gas-powered engines as Underwriters Laboratories listed equipment on trucks. W. K. Perkins, manager of motor truck sales, announced.

International's new LP-gas (propane-butane) engines are optional on



all International truck models equipped with the company's heavy-duty Super Red Diamond engines. The new LP-gas-powered models include the LP-185, LP-195, and LP-205 Roadliners, and all other models in the L-185 through LF-210 series, Perkins said.

The potential production of LP-gas is large, Perkins pointed out, with costs in most states running several cents per gallon under that of gasoline. The fuel is available at approximately 4000 bulk distributing plants in the United States.

Large fuel tanks, standard on International's LP-gas-powered units, permit trucks to run as far as 400 miles between refuelings.

## Offer Hardfacing Wall Chart

A new wall chart which details the proper hardfacing rod for the job has been released by the American Manganese Steel Division of the American Brake Shoe Co. The chart divides welding into basic operations, under which are listed the equipment parts to be Amscoated together with the recommended rod, available sizes, and preferred method of application. A fuller description of the uses of each rod also appears on the chart. The result is an easily read, thorough, and conveniently located reference guide.

The chart is 17 by 26 in. with tabs

attached for easy hanging and has a lacquered surface to keep it readable under shop conditions. A wall chart may be obtained by writing, American Manganese Steel Div., Chicago Heights, Ill.

## Jet-Piercing Advances

Secondary blast holes are now being pierced at a rapid rate in some quartzite and sandstone quarries, using multiple hand-operated Jet-Piercing units supplied with oxygen, fuel and water from a compact mobile carrier. A unit of this type, operating in a Canadian quarry, enabled four Jet-Piercing blowpipes to pierce blast holes for two hours without shut-down.

The piercing blowpipes used were developed by Linde Air Products Co., a Division of Union Carbide and Carbon Corp. The mobile supply carrier was constructed by the quarry from specifications supplied by Linde and modified by the quarry operators for their particular use.

Marketed as the Linde FSJ-1, the manual Jet-Piercing blowpipe has



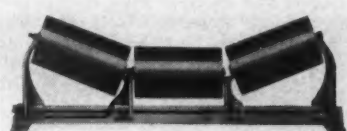
these important design features: a burner from which the combustion gases emerge at supersonic speeds (in excess of 6000 fps); a hole-sizing shell which controls the minimum size of the hole and protects the copper burner; and a sliding shield which protects the operator against the steam and spallings ejected from the hole during the piercing.

For further information on the Jet-Piercing process or the equipment required, please write to Linde Air Products Co., a Division of Union Carbide and Carbon Corp., 30 East 42nd Street, New York 17, N. Y. Blueprints outlining typical set-ups and estimated basic bills of required materials are available to the user who can modify them to suit.

## Improve Grease Tubing

An improvement in belt conveyor idlers greasing design is announced by Chain Belt Co. of Milwaukee. Rigid steel grease piping has been replaced by reinforced flexible automotive type grease tubing, which will take higher gun pressures, and will not be broken off in shipment.

The flexible sections are made in



lengths which allow them to "hug" the inside of the inverted angle or channel base. Grease tube extension to the far side is accomplished by threading a flexible section through the base to the grease fitting at the near side.

New, also, is the location of the grease fittings. They are placed so as to be more accessible, permitting safe servicing at any time and are protected during shipment by the idler base.

The new design eliminates the headache of broken grease lines, and will be welcomed by maintenance men, according to the manufacturers. For further information on this design improvement, write Chain Belt Co., 1600 W. Bruce Street, Department PR, Milwaukee 4, Wis.

## Long Hole Drilling Aid

For drilling long holes varying in depth from 20 to 150 ft, Rock Bit Sales & Service Co. offers a complete set of tools for use with the standard percussion type rock drills. These tools include: Tru-Seal shank, adapters, couplings, extension rod, Rok-bit tungsten carbide bits. They are for use in drilling grout holes, test holes, sub-level bench stoping holes or blast holes of standard diameters—1½ in. and 3 in. Such holes can be drilled in any type of rock or ore and in any direction, the manufacturer points out, by following a recommended procedure. Based on over a year's successful field operation, the manufacturer claims the



couplings and adapters are designed to be self-cooling and self-cleaning. The tool's design keep the hole in alignment and eliminate excessive vibration at maximum depth. They also point out that where user has his own steel shop, the sectional steel can be made on the job. Descriptive bulletin available from Rock Bit Sales & Service Co., 2514 E. Cumberland Street, Philadelphia 25, Pa.

### Cords Pass Test

Cornish Wire Co., manufacturer of cords and wire harness assemblies, announces that the United States Bureau of Mines and the Department of Mines, Commonwealth of Pennsylvania have registered its type SO Coroprene packeted cords as having successfully passed their flammability tests. This flame-proof cable, identified in sizes of 14-gauge and larger as P-117BM, is now in normal production and available for limited general use in American industry. Quotations and further data may be had by writing Cornish Wire Co. at 50 Church Street, New York 7, N. Y.

### Make Tires Stronger

Designed to solve one of the major problems in the use of pneumatic tires on mobile mine equipment—inflation of tires on shuttlecars—a new extra heavy pneumatic tube for such service has been developed by The B. F. Goodrich Co., Akron, Ohio. Operation of such mobile equipment is expanding rapidly, particularly in coal mining.

Made of butyl rubber, which retains air to a much greater degree than any rubber yet discovered, the tubes are built almost twice as thick as conventional tubes used in this service. They are manufactured in three sizes, 7.00-15; 7.50-15 and 8.25-15.

The company believes that barring injury to the tire or tube, the new extra heavy tubes will hold their recommended air pressures from one year to 18 months with only minor reduction in air pressure. They are equipped with a special valve cap which can be put on or taken off only with a small key. This is to prevent the cap being removed except by the maintenance people assigned that task.

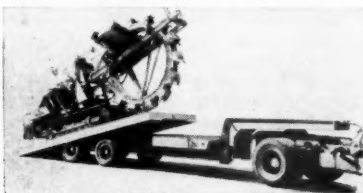
Besides saving the mine operator the expense and problem of weekly inflation, the company points out that the new tubes will prevent the destruction of many tires now ruined prematurely largely through underinflation combined with heavy loads which create flex breaks in the tire body. This condition often exists because mine operators do not have air compressors available for weekly inflations.

Besides shuttlecar service the company believes the new tube can be effectively used on low platform trailers, lift trucks and similar vehicles.

### Load Equipment Easier

A new heavy-duty gooseneck-type trailer with tilting platform, for transporting heavy machinery with standard fifth wheel tractors, has been announced by La Crosse Trailer Corp., La Crosse, Wis. The trailer is easily loaded or unloaded in five minutes by one man, without skids or blocking.

Available in 14, 18 and 22-ton capacity the new Model GTTA trailer



is of tandem axle design, with 96-in. width platform, which tilts into loading position by releasing simple lock at front of platform. Two double-acting hydraulic cylinders "cushion" load during tilting. After load is driven or winched into place, platform locks automatically in horizontal position for hauling.

The trailer is ruggedly constructed with one-piece formed gooseneck and subframe, and is equipped with "walking beams" supporting the axles, to provide maximum oscillation for equal load distribution over any type road surface. Constant rise S cam brakes operated by worm gear slack adjusters assure perfect braking contact at all times.

### Improve Respirator

Designed to provide the highest degree of user comfort ever attained in a respirator, 10 recently engineered advances are incorporated in a new dust respirator just announced by Mine Safety Appliances Co., Pittsburgh, Pa.

The new respirator, called the Dustfoe, No. 55, weighs only 2½ oz, 25 percent less than previous models. Breathing resistance has been cut in half, with users of pilot models reporting they were "hardly conscious of wearing a respirator."

A 50 percent reduction in width of the filter holder eliminates a "blind-spot" area and greatly increases the downward vision. Simplicity dominates the new features of the respirator, resulting in a 25 percent reduction in maintenance requirements over other respirators. Construction of the assembly allows for quick changing of filters and easy replacement of parts. The formable aluminum facepiece is readily molded to all normal face contours and the replaceable "tite-seal" face cushion conforms to all facial lines to assure a perfect seal without uncomfortable pressure.

Both the simplicity of construction and the small number of basic parts

allow for easy disassembly for regular recommended "laundering" in the new M.S.A. Cleaner and Sanitizer.

Full details of the M.S.A. Dustfoe No. 55 are included in Bulletin No. CM-14, available without charge from Mine Safety Appliances Co., Brad-dock, Thomas and Meade Streets, Pittsburgh 8, Pa.

### Better Engine Rating

Refinement in engine design of four Cummins diesels, manufactured by Cummins Engine Co., Inc., at Columbus, Ind., has allowed the horsepower ratings for continuous-duty applications to be increased.

Cummins engineers recently introduced a full flow lubrication system and continuous groove main bearings on engine models H-600, HR-600, HS-600, and HRS-600 allowing an increase in continuous operating speeds from 1600 to 1800 rpm. New and old continuous-duty ratings for these engines:

Cummins Diesel	New Rating 1800 rpm	Old Rating 1600 rpm
H-600	102 hp	94 hp
HR-600	115 hp	106 hp
HS-600	140 hp	132 hp
HRS-600	157 hp	142 hp

Company officials point out that this increased horsepower and rpm simplifies the application of Cummins diesels to many types of industrial equipment. The engines may now be coupled directly to centrifugal pumps that operate at a speed of 1750 rpm as well as to generators operating at synchronous speeds of 1800 rpm.

### Announce Continuous Mill

Development of a new heavy-duty continuous ball or tube mill has been announced by the Patterson Foundry & Machine Co. of East Liverpool, Ohio. Improved mechanical features of the mill are said to insure economical and reliable continuous grinding operation under the most severe conditions.

Adaptable to fine or coarse, wet or dry and open or closed circuit grinding, the new Patterson continuous mill may be used for pulverizing chemical raw materials, ceramic raw materials, minerals, and numerous finished products.

The manufacturer states that the mill may be used to deliver a finished product, or it may be operated in conjunction with Patterson classifying equipment of various types. Hollow trunnions are provided for continuous feed and discharge of materials.

Continual flushing of dirt and grit from the bearings is accomplished by an oil-circulating system which lubricates the bearings prior to starting the mill, thereby reducing the required power for starting. A combination

water-cooling and lubricating system is available for the plastic sleeve bearing which the manufacturer states results in extremely low bearing maintenance.

Standard Patterson continuous ball and tube mill sizes range from two ft diam by two ft long, to 10 ft diam by 24 ft long.

A descriptive bulletin may be obtained by writing to the Patterson Foundry & Machine Co., East Liverpool, Ohio.

### Thaw Frozen Ore in Car

The Atlas Car and Mfg. Co. now installs a lacework of strip heaters under the floor of its 60-ton, bottom dump ore-transfer cars as a means of keeping ore from freezing and sticking to the interior of the cars during winter months.



The cars, manufactured by the Cleveland, Ohio, firm, are used for filling the bins on blast furnace high lines.

Before the Atlas Co. started equipping its cars with General Electric strip heaters, it was common practice to prevent freezing by putting a quantity of burning coke in the bottom of the hopper before loading it.

The barrage of heaters are clamped to the hopper plates in a manner which allows for expansion and contraction, and allows for easy replacement. Each group of heaters is connected to a fused safety switch at the control panel to facilitate maintenance. In order to transfer a maximum amount of heat by conduction to the hopper plates, the heaters are clamped directly to the plates.

The heaters, moreover, are enclosed in a steel cabinet with a thermal insulation fastened to the inside of the cabinet's surface. This prevents undue heat loss from the other side of the heaters so that the loss of heat by convection to the surrounding air is also used to warm the hoppers.

To avoid unnecessary use of the heaters and to conserve power, a G-E heavy duty industrial thermostat is adjusted to cut off power to the heaters when they are not needed. The heaters can be disconnected manually by means of a switch in the coil of the heater contactors.

### Offer Welders Goggles

A new welder's goggle, featuring removable and adjustable blinder-type leather side shields, is announced by American Optical Co., Southbridge, Mass.

The new goggle can be adjusted for perfect fit and maximum comfort by loosening the endpiece screws. By removing the endpiece screws, side shields can be taken off for cleaning, sterilizing or replacing. The goggle, series 3081A, replaces AO's 3081 welder's goggle, the company states.

The side shields of the new goggle are made of soft leather, providing greater comfort and increased protection against heat, harmful light and flying particles. The cylinder bridge and reinforcing bar are also covered with leather.

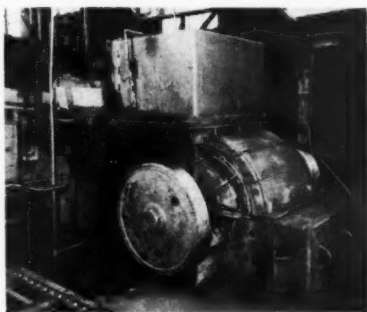
The company also announces that the side shields are available for its No. 3080 welder's goggle.

### Improve Crushing

The new American 30-S Heavy Duty Crusher is designed as a primary crusher, reducing coal and impurities prior to going to the washery.

According to the manufacturer, the Heavy Duty 30-S gives more efficient and lower cost coal preparation by its ability to crush ROM Coal, Rock, Slate, Sulphur Balls, and "Gob" to minus eight in. or minus six in. without oversize and without choking up—regardless of the toughness of the materials included in the ROM coal.

The saving in labor cost is the big advantage claimed for the new



crusher. At installations already in operation picking operations have either been eliminated completely or reduced by two-thirds of previous costs.

In addition, American 30-S Heavy Duty installations have resulted in a consistent saving in coal. Coal formerly thrown away by pickers because of impurities is now recovered by crushing and washing.

Further information on this new crusher can be had by addressing your inquiries to American Pulverizer Co., 1019 Macklind Avenue, St. Louis 10, Mo.

### —Announcements—

Appointment of A. C. Paulson as manager of the St. Paul Branch of the Crucible Steel Co. of America, was recently announced by W. H. Wiewel, vice-president in charge of sales.

E. D. Tull has been named to the newly created position of vice-president for personnel and plant, at Cummins Engine Co., Inc., Columbus, Ind.

Atlas Powder Co., Wilmington, Del., has announced the election of William J. Wiley to the Board of Directors and to the office of financial vice-president.

Arthur F. Vinson has been appointed manager of employee and community relations of General Electric's Small Apparatus Divisions with headquarters at Lynn, Mass., according to an announcement by Nicholas M. DuChemin, general manager of the divisions.

John M. Olin, president of Olin Industries, Inc., announced recently the appointment of F. S. Elfred as executive vice-president and B. E. Bassett as vice-president for production.

### CATALOGS AND BULLETINS

#### HEAVY-DUTY PIPE COUPLING.

Naylor Pipe Co., Chicago. An illustrated bulletin describing the Heavy-Duty Wedge-Lock Coupling for use on temporary or permanent pipe lines. A hammer is the only tool required to connect or disconnect the coupling. Complete specifications on this one-piece positive type coupling are included in range of light-weight pipe sizes from eight in. to 30 in. in diameter. Copy of this bulletin may be obtained from the company at 1230 East 92nd Street, Chicago 19, Ill.

#### SLING HANDBOOK & RIGGERS MANUAL, Union Wire Rope Corp., 2144 Manchester Ave., Kansas City 3, Mo.

The handbook illustrates 11 sling types and covers their dimensions, weights and safe working loads. Some 30 illustrations of sling uses accompany the factual data as a help in selection of proper types. Also illustrated and detailed are 11 types of sling fittings, valuable information on the care of slings, methods of factory fitting and packaging and information on braided wire fabric for those who maintain rigging lofts. Illustrated, step-by-step instructions for splicing the new braided wire sling fabric is included. Combined with the sling handbook is a comprehensive riggers manual. It illustrates and gives step-by-step instruction on wire rope splicing.


Data on efficiencies of wire rope attachments and illustrated direction for attaching sockets or ferrules are also included in the riggers manual. The back cover of this 48 page sling handbook and riggers manual is devoted to illustrations showing standard hand signals to be used in operating overhead traveling cranes, locomotive cranes and whistle signals for cranes and derricks.

The Sling Handbook and Riggers Manual will be sent without charge to sling and wire rope users. Write: Public Relations at the above address.

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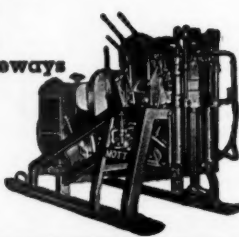
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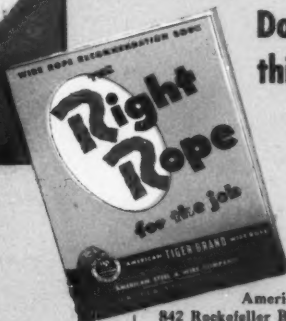


● For every job, there are a number of possible choices of wire rope—but there is usually one best choice. *The wrong choice may cut your wire rope service in half.*

Our new book, "The Right Rope for the Job" gives a complete listing of the correct rope to use for each application in a wide variety of industries. This information, prepared by experienced wire rope engineers, can definitely help you reduce your wire rope costs.

If your particular conditions are not covered, the Tiger Brand Wire Rope Specialist in your area will gladly help you determine the best ropes for your particular needs. It's to your advantage and ours, too, that you get the Tiger Brand Rope that will give you the best service. Send the coupon for a copy of the book and check your choice of ropes.

In the period ahead you will want the best rope you can get—and that's American Tiger Brand.



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# In Emergencies—

## While OUTSIDE HELP is on the way—

## This INSIDE HELP is on the job



### M·S·A SELF-RESCUER

For immediate breathing protection in emergencies caused by fire or explosion, M.S.A. developed the Self-Rescuer. This approved safety item provides the precious minutes of emergency breathing protection so vital to the miner while traveling through carbon monoxide to fresh air.



The Rescuer is available in individual carrying cases or in Cache Assemblies for storage in working sections, on man-trip cars and along belt lines. U.S. Bureau of Mines Approved. Bulletin No. BC-1.



### M·S·A "ALL-SERVICE"® MASK

In toxic atmospheres where there is sufficient oxygen, this dependable mask provides complete breathing protection against smoke, poisonous gases and fumes (including carbon monoxide), singly or in combination. Bulletin No. EA-8.

### M·S·A CHEMOX®

Inside emergency efforts play an important role in the success of the overall rescue operation. Miners equipped with the M.S.A. Chemox can safely travel through any area with the complete assurance that their breathing is safeguarded. All the wearer does is breathe—the Chemox generates its own oxygen supply from a replaceable canister and can be put into service in seconds. Weighing only 13½ lbs., it is designed for freedom of movement. U.S. Bureau of Mines Approved. Bulletin No. B-14.



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